John E. Sweet

A HISTORY OF
HE AMERICAN SOCIETY OF
MECHANICAL ENGINEERS

FROM 1880 TO 1915

BY

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President, 1906
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This History of The American Society of Mechanical Engineers covering one-third of a century, from 1880 to the beginning of 1915, has been prepared under the direction of the Council. It has been carried out under a committee composed of Prof. John E. Sweet, one of the founders of the Society, Charles Wallace Hunt, Ambrose Swasey, Frederick Remsen Hutton, Past-Presidents of the Society, and Henry Harrison Suplee. The Committee is greatly indebted to Mr. Suplee for pioneer work in gathering material. The final preparation of the History was committed to Professor Hutton, who served the Society as its Secretary from 1883 to 1906 and as President in 1906-1907. He has been Honorary Secretary of the Society since 1907.

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CHAPTER I

Introductory

The concept of an American Society of Mechanical Engineers took shape in the winter of 1879-1880.

At that time there were two engineering societies in existence in the United States. The American Society of Civil Engineers had been founded in 1852 and on January 1, 1880, its total membership was 601. The American Institute of Mining Engineers had been organized in 1871 and, on the same date, it numbered 1,031 members. The transactions of both these societies were broad in their scope, but there were many who felt that in neither organization did the engineers of production and of the factory and power plant, and the designers and managers of the producing machine shop gather in sufficient numbers to induce the preparation of papers and the presentation of discussion in these particular fields. At a little dinner in 1879 one of the contributors to a mechanical journal met several of the officers of its company. A series of articles which had appeared in the publication were discussed and one of the participants said, "I would give a ten dollar bill to meet the author of these papers and get acquainted with him; I like his style, and I think he must be a good fellow." Another said, "That contributor is as anxious to meet you as you are to meet him." It was then recommended that the journal coöperate in getting up a subscription

dinner at which these contributors might be brought together for mutual acquaintance.

The idea of mutual acquaintance broadened out into the larger purpose of a Society through which engineers could contribute their experience for record and their creative work in design, and secure a discussion of their problems and achievements. The British journals, known as the *Engineer* and *Engineering* of London, were then established; the *Scientific American* with its supplement, the *Journal* of The Franklin Institute, and Van Nostrand's *Eclectic Engineering Magazine,* together with certain specialized railroad papers and textile journals, were in the field, but were necessarily hampered by the limitation of technical journalism as to the permissible length and acceptable content in engineering papers. It had not then become the custom for engineers to contribute to periodicals of the weekly class. Mr. John C. Hoadley's work in testing the pumping engines of New England waterworks was published in pamphlet form as a municipal document. The records of Mr. E. D. Leavitt's successes and economies in big engines at Lynn and Lawrence were not easy to find. Builders' catalogue literature had scarcely begun or was on a very unimportant plane. Prof. R. H. Thurston had contributed his reports of tests on furnaces burning wet fuel to the Society of Civil Engineers and Mr. Alex. L. Holley had presented papers to the Mining Engineers on the machinery for the Bessemer steel industry. There was no organization of a distinctly professional sort as yet for the mechanical engineer.

The volume of professional literature in English relating to mechanical engineering in its modern sense was decidedly limited up to this time. The libraries of the mechanical engineers doubtless contained the notable Manuals of Prof. R. H. Thurston, covering the design of the steam boiler and the steam engine. Joshua Rose, Egbert P. Watson and Coleman Sellers had made contributions with respect to tools and machine shop methods. John Richards had a book on

Woodworking Tools, and Professor Willis' Treatise on Mechanism, and Goodeve's Mechanism covered well the ground of which they treated. The textbook on strains in material was Bindon B. Stoney's Treatise on Strains; Rankine's books and Weisbach's Mechanics of Engineering were the storage warehouses of formulae as respects dynamic problems. Certain French and German professors had written on machine design and Professor Reuleaux's Kinematics had appeared. Zeuner had written his Valve Gears and his *Warmetheorie.* D. K. Clark had published his Manual of Rules, Tables and Data; in Germany Redtenbacher had issued his Machine Design, and in England Professor Unwin had produced his work on the same subject. John Bourne and John Farey of England had written historical treatises, but practice had far outrun them and was making little record of such progress. Trautwine and Haswell, Nystrom and Molesworth were known for their Pocket-Books; and notable work of research had been done by Benj. F. Isherwood (Engineering Precedents), and Charles H. Loring and Charles E. Emery had made their historic investigations for the navy and other governmental departments. There was, however, no central organization to bring such material together and to claim it for its own. Spon's Encyclopedia and Knight's and Appleton's Dictionaries were in most libraries.

The Centennial Exposition in 1876 in Philadelphia was responsible for a national quickening in mechanical matters and for a growing sense of latent power. The big central Corliss engine of Machinery Hall was a splendid object lesson and this Exposition was signalized by the single valve automatic engine with flywheel governor designed by John C. Hoadley, by Professor Sweet's design of the Straight Line engine, and by a series of boiler tests by Charles E. Emery, Charles T. Porter and Joseph Belknap. These all marked epochs in the engineering history of the United States. Moreover, in the fifteen years since the Civil War the enormous increase in size and productivity of industrial plants had just

begun. The Land Grant colleges had their graduates of a dozen years practising their profession and by the natural processes of promotion the products of the older schools of engineering had attained positions of trust and influence.

It was at this juncture that correspondence was begun between Prof. John E. Sweet and Mr. Jackson Bailey, then editor of the *American Machinist* of New York, looking to the formation of a national society to be devoted to the advancement of mechanical engineering. The *Machinist* had been started in 1877 and at its office, 96 Fulton Street, New York, Mr. Bailey arranged to have Professor Sweet prepare a list of persons to whom invitations should be sent, asking them to come to a conference at the *Machinist's* office to discuss this question. Professor Sweet with characteristic modesty required much persuasion to issue such a call on his own initiative. In fact a personal visit from Mr. Bailey to him at Syracuse was necessary, Mr. Bailey being instructed to place the services of the *American Machinist* at Professor Sweet's command in furtherance of the plan. The result of this visit was that steps were taken for the active development of plans for such a meeting.

Instead of acting alone, Professor Sweet communicated with Mr. Alexander L. Holley and Prof. R. H. Thurston, and it was arranged that a call for a meeting be issued by Professor Sweet. As will be seen by the following copy of the call, it was thought best not to make the matter too public until the extent of the response should be ascertained. The letter, one of the original copies of which has fortunately been preserved, read as follows:

11 Eldridge Street, Syracuse, N. Y.
January 18, 1880.

DEAR SIR,

It having been suggested by several prominent engineers that a national association of mechanical engineers would be desirable, and a meeting for the purpose of taking steps to organize such a society being in order, your presence is hereby requested at the office of the *American Machinist*, 96 Fulton Street, New York, the

sixteenth day of February, 1880, at 1 o'clock sharp, at which time the necessary steps for organizing such an association will be made.

Any inquiries in regard to the meeting will be cheerfully answered.

Please avoid allowing this to be made public.

Very truly yours,
(*Signed*) John E. Sweet.

These letters, sent out during the latter part of January 1880, led to a meeting on the date set, February 16, 1880, in the editorial rooms of the *American Machinist* on the third floor of the building at the southeast corner of Fulton and William Streets in the City of New York. The effort resulted in an attendance of thirty, with letters from eighteen others. The list is appended:

Baldwin, Stephen W.
Barnard, George A.
Church, William Lee
Copeland, George M.
Copeland, Charles W.
Coon, J. S.
Couch, A. B.
Emery, Charles E.
Fish, John
Forney, M. N.
Grimshaw, Robert
Hemenway, F. F.
Hines, D. S.
Hoffman, Wm. H.
Holley, A. L.
Kraus, H. T. C.
Leavitt, E. D., Jr.
Lyne, Lewis F.
Newton, C. C.
Odell, W. H.
Pickering, T. R.
Porter, Chas. T.
Smith, Frank C.
Sweet, John E.
Trowbridge, W. P.
Watson, Egbert P.
Webber, Samuel S.
Webber, Samuel
Wolff, Alfred R.
Worthington, Henry R.

Letters were read from:

Cooper, John H.
Hague, Chas. A.
Hill, J. W.
Hoadley, J. C.
Kent, William
Le Van, W. Barnet
Lyman, E.
Norman, Geo. H.
Parks, E. H.
Penney, Edgar
Pond, Frank H.
Richards, Chas. B.
Robbins, A. H.
See, J. W.
Swasey, Ambrose
Warner, Worcester R.
Williams, W. J.
Woodward, F. G.

It may be interesting to glance briefly at the mechanical engineering standards and achievements of this period. The battle of the three-high roll train for the steel mill against the two-high reversing mill had only recently been fought. The Holley type of smelting plant

for the Bessemer practice was contesting with the John Fritz design for supremacy. All Bessemer steel was acid. The Lucy furnaces of Pittsburg were in the height of their importance as rapid producers of pig-iron. The Bush Hill Iron Works of Philadelphia and the name of Robert Moore were identified with steel and iron works machinery. Waterworks pumping was still done with Cornish pumps or by big beam-engines, and Mr. Worthington's arguments to secure consideration for his type of horizontal duplex non-flywheel pumps for this service had the old conservatism to overcome. Worthington pumps of large capacity were still something of a novelty. The New York Steam Company was beginning to introduce the Holly-Lockport system of distribution of high-pressure steam through pipes buried in the street with definite anchorages against expansion; and Mr. Charles E. Emery had just completed his researches as to the best non-conducting material. William Sellers and Company of Philadelphia were urging the flat top for the shears of lathe beds, as against the inverted V-type of the New Englander, and had introduced the worm-gear drive for planers.

Geo. H. Corliss had a practical monopoly of large New England mill-engines, although the Brown engine of Fitchburg, Woodruff and Beach, and the Putnam Machine Company were pressing him hard, and the rivalries of the Harris-Corliss and Hewes and Phillips types were in the field. The Ohio types of Corliss were little known outside their own territory. Edison was installing isolated plants for electric lighting with Armington and Sims or Sweet Straight Line engines. A downtown central station for the sale of lighting current was about to be built in New York. Mr. Edward Weston's regulator for variable demand of current was the successful solution for small plants, and a big battery of lamps was installed to take excess current in larger installations. Charles T. Porter was having his high-speed engines built under contract on orders; the Continental Iron Works had a shipyard, although they were

swinging over to gas works machinery; John Roach and Sons were operating the Morgan Iron Works and building marine engines in New York and ship hulls at Chester, Pa. Air compressors of small capacity were built by both Rand and Ingersoll for their rock drill business, but for little other use. Mackintosh-Hemphill and Company of Pittsburgh, and the Cuyahoga Works of Cleveland had a large part of the blast-furnace machinery work of the Middle West of that day. Fraser and Chalmers of Chicago had the lion's share of the machinery for the mining, smelting and ore-dressing business of the West and South America.

The great development of the big engine for deep mining by the Calumet and Hecla Company was on Mr. Leavitt's drawing boards at Cambridgeport, and I. P. Morris and Company were the important builders of big machinery in their territory. The Delamater Iron Works of New York were just about to pass from the manufacture on special orders and designs for John Ericsson and others, to the production of standard machinery of uniform or repeated duplicate type. Duplication of standard forms by milling machine and turret lathe was an established art in New England for gun parts and sewing machines; the yearly output of typewriters was not large and was made by two or three concerns only. Engines of large cylinder volume were to be found in slow-moving blowing engines of the inverted vertical or horizontal type for blast furnaces; in the beam engines for paddle-wheel driven vessels and for waterworks pumping engines. Locomotive boilers had the narrow fire-box which followed the necessity of keeping it between the frames, except where the Wootten type for fine anthracite slack had made its way. The compound inverted vertical type of engine was the standard for transatlantic deep-water screw-propelled ships. All locomotives were simple single-expansion engines, with Stephenson link motion for the valves. All power plants were isolated units. The gas-engine was in small

sizes only, single-cylinders with sliding valves and few in use. There were no motor vehicles of any type.

Mr. Samuel Webber, named in the foregoing list, was almost the only exponent of turbine waterwheel practice, although there were many builders of small wheels in an empirical way, in New England and Ohio. Of the others who were present at this preliminary conference, Messrs. Grimshaw, Hemenway and Odell were experts specializing in the application of the indicator to the slow or moderate speed engines of that day. Mr. Forney was easily the best informed person on the locomotive engine. Mr. Thos. R. Pickering in Connecticut was making and marketing his design of steam engine governor with flat spring arms. Mr. George H. Norman was a successful and wealthy builder of private waterworks for towns and villages. Professor Trowbridge had recently became professor of mechanical engineering at Columbia University, having previously been vice-president of the Novelty Iron Works of New York, of which the veteran Horatio Allen had been president. Horatio Allen ran the first locomotive imported from England which drew a train of cars on this side of the Atlantic. Messrs. Couch and Newton represented machine-tool building; Messrs. Leavitt, Copeland, Porter, Sweet, Worthington and Coon were in the class of designers of engines. Mr. Holley was the exponent of the mechanical engineering of steel production. Messrs. Lyne and Watson, together with the *American Machinist* staff, represented the modest technical journalism of that day. It was a representative gathering in many ways, but could not have realized its own significance.

CHAPTER II

The Preliminary Steps Before the First Meeting

The conference summoned by Professor Sweet at the *American Machinist* office at 96 Fulton Street, New York, on February 16, 1880, was called to order by him, and Mr. Alexander L. Holley was nominated for chairman.

Mr. Holley was a man of most pleasing personality, a universal favorite by reason of his character, his gifts and his unselfishness. He was, moreover, a most talented and persuasive speaker. Mr. Samuel S. Webber, a young son of the veteran Samuel Webber of Charlestown, New Hampshire, was chosen as Secretary.

Mr. Holley made an opening address on the Field of Mechanical Engineering, covering his conception of it and the type of man from which such a society, if organized, might draw its membership. The engineer of fixed works, usually called the civil engineer, he said, has his structures built for him by mechanical means. The military engineer has his fort or gun-carriage made by machines. In bridge-building the shop is the economic factor; in mining the work of mining ore is done by the machine drill, the steam hoist, the power transportation system. In metallurgy and the rolling-mill, in the foundry and the forge, there are thousands of special machines and tools at once presented to the mind. In railways and in transportation by water the structures and the working are all in the field of mechanics and dynamics, and the railway master mechanics are one of the largest defined classes of mechanical engineers.

In agriculture, architecture, and in the industries in general, the textile mill, the paper mill and the factory of all kinds, the motive power and most of the equipment are the creative and the operative burden of the me-

chanical engineer. Hence, the Society proposed should find no lack of membership material.[1]

Mr. Holley also reviewed the advantages and character of such an organization as proposed, dividing them as follows:

(*a*) The collection and diffusion of knowledge

(*b*) The advantages from personal acquaintance among the members

(*c*) The educational value of the habit of writing papers and of debate upon them

(*d*) The significance of the endorsement of a high quality of elected membership.

Finally he referred to the tendency of mechanical engineering in America to combine the professional scientifically trained mind with the qualities of leadership in the processes of production, so that the engineer is often also a business man. Hence, the necessity was plainly present to his mind, that membership should be sought for two classes: for the professional man engaged in an office practice, either by himself or in the employ of an industrial corporation; and for the executive type of man whose compensation was for his talents and success on the business side of industry. The Junior membership for the young man in the shop and for the young graduate of engineering schools was obviously necessary. He urged the policy of a membership vote on candidates, the significance of representative engineers for office in the new organization, and the advisability of frequent meetings. The value of the first papers as setting a standard of excellence for the future and securing interest for the Society and its work was his closing word.

There were no published minutes of this preliminary

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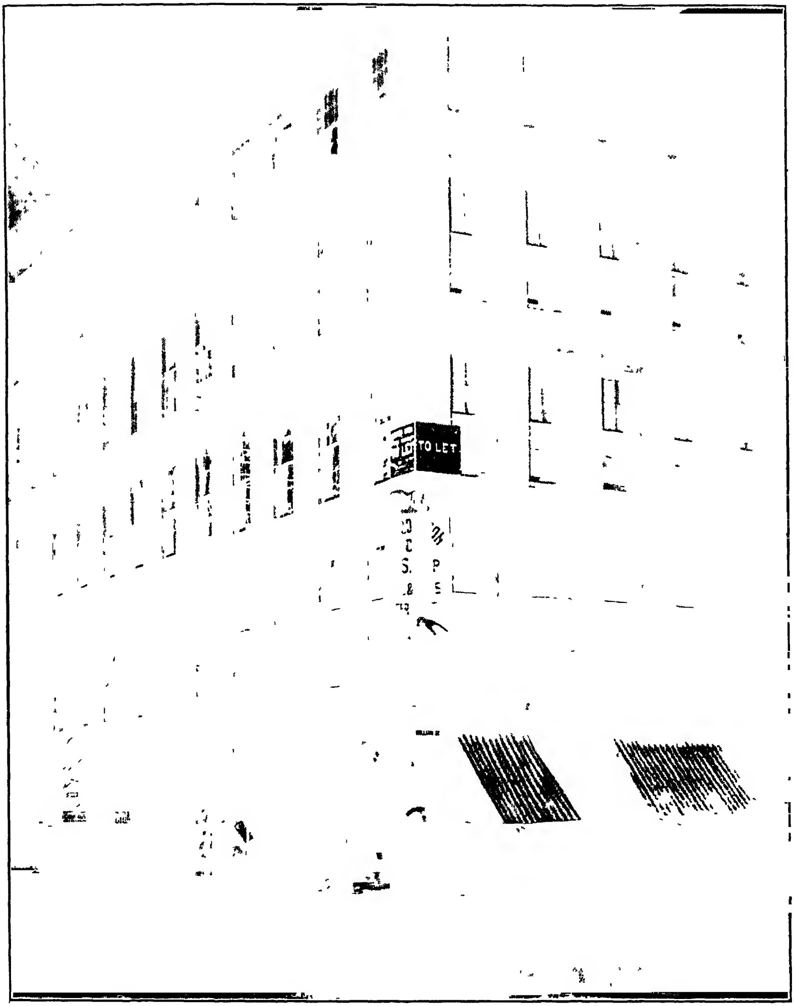
[1]It may be interesting to compare the viewpoint of this address with the address of the President of the Society on laying down his office in 1907, in which the development of the mechanical engineer during a period of twenty-five years is discussed in detail: The Mechanical Engineer and the Function of the Engineering Society, Trans. Am. Soc. M. E., vol. 29, p. 627, reproduced as an Appendix to this History.



No. 96 Fulton Street, New York. Place of Preliminary Meeting

meeting, but from manuscripts and other sources there is a record of a discussion as to the name to be given to the new body. Professor Trowbridge, familiar with the practice at that time in Yale University, urged the term "dynamical" in lieu of "mechanical" as the qualifying adjective for the proposed type of engineer, on the ground that the higher field of such persons was the generation and control of power. The inevitable confusion with the name dynamo as a machine for converting mechanical energy into electrical was argued against this suggestion, and finally, at the suggestion of Mr. Chas. W. Copeland, the meeting accepted the name, American Society of Mechanical Engineers, following the example set by the American Society of Civil Engineers, already well and favorably known.

This meeting thus practically decided that there *was to be* such a society; it only remained to formulate the details.

The first step was to appoint a committee to draw up the basis of organization and formulate its rules; this was done by making Messrs. Henry R. Worthington, Eckley B. Coxe, Jackson Bailey, Genl. Quincy A. Gillmore, Prof. W. P. Trowbridge, M. N. Forney and A. L. Holley such a committee. A committee to nominate officers under such organization was appointed also, consisting of Messrs. A. L. Holley, John L. Sweet, E. D. Leavitt, C. T. Porter and H. R. Worthington. An adjournment was then taken to April 7 to hear the reports of these committees, to act thereon and to effect a permanent organization thereunder.

It may be helpful to stop a moment to consider who these men were who had in their hands the creation of the first standards and policies of the new society, and the selection of the first officers, who were to guide its initial procedure.

Mr. Alexander L. Holley had brought over the Bessemer process from England and was the first consulting engineer for the Bessemer association which had been formed to administer and control the patents and ma-

chinery. He had broken away from the slower British standards of machinery and had created a distinctly American plant, utilizing gravity largely in handling the fluid metal and hydraulic power in cranes and convertors. Beside his engineering ability he was a man of rare personal qualities. He had been active in the Institute of Mining Engineers and was a member of the Civil Engineers. He was then in the prime of his life and full of intense professional activity.

Mr. Henry R. Worthington was the founder of the duplex pump industry, and the originator of the type of pump using no flywheel to carry the piston past its dead point at the end of the stroke. He had succeeded in convincing municipalities and villages that his system was reliable and of low operating cost when its initial cost was considered. His hair and beard had grown white.

Mr. Eckley B. Coxe was a mining engineer, owner and operator. He had translated Weisbach's Mechanics of Engineering into English and was a leader in the Institute of Mining Engineers. A splendid figure of a man, philanthropic among his work people, his State had sent him to its legislature and he was a power in his bailiwick. The new Society made him its president in the year when the country was celebrating the four-hundredth year of its discovery and many foreigners were to be expected. Educated in Germany and in France, he was well and favorably known on both sides of the Atlantic.

Genl. Quincy A. Gillmore was an authority and writer on cements, paving stone, masonry and similar details of fixed structures, a trained army officer and a civilian practitioner.

Mr. M. N. Forney was trained under Ross Winans and Benj. H. Latrobe on the Baltimore and Ohio Railroad. He had been a leading figure in journalism as editor of the *Railroad Gazette* and had compiled his well-known Catechism of the Locomotive. He was a leading spirit in the Railway Master Mechanics Association and

the Master Car Builders Association; had served on many of their important committees to formulate standards of practice, and was an expert on the conduct of technical conventions.

General Trowbridge was a West Pointer, a specialist in fortifications of cities, professor at the Sheffield School of Yale University and later at Columbia University, where he was laboring at the time of his death. He was a man of the soundest judgment and broad experience.

Mr. E. D. Leavitt was best known for his notable successes in the design of high-duty compound pumping engines for city waterworks service; he was then on the point of completing The Superior, the great engine for the Calumet and Hecla Copper Mining Company. He stood for high economy in slow stroke engines and with an elaborated valve-gear, just as Mr. Charles T. Porter stood for economy in the type operating at high rotative speeds with simple valve gear.

Mr. Jackson Bailey represented the practical type of engineering as it had developed in the machine shop and the factory. He stood also for the advantages which the new movement was to offer to technical journalism and for the effective coöperation in the new Society of the *American Machinist*.

Prof. John E. Sweet had been for several years the beloved head of the shop department of Cornell University. He had recently resigned to enter on the manufacture of his design of the Straight Line engine, embodying certain new solutions of the problems of stress in the bed-plate, of governing, and of long life of details of construction and adjustment.

These men were the founders of the Society. Two of them, Holley and Worthington, were made Honorary Members in Perpetuity by vote of the Council after the death of Mr. Holley in 1882 (Mr. Worthington died in 1880). Professor Sweet (long may he survive) is undoubtedly entitled to a similar honor.

On the evening of this day of the preliminary conference, the gentlemen who had thus far taken the

initiative gathered for a dinner at the Astor House at Broadway and Barclay Street in New York to talk their achievement over and plan for the next steps to be taken. A menu of this dinner is preserved in the archives of the Society.

CHAPTER III

THE FIRST MEETING. THE ORGANIZATION

The preliminary conference of February 16, 1880, decided that there was to be an American Society of Mechanical Engineers. It appointed committees to draft by-laws to organize the new body, and to present a board of officers for its first year, such committees to report at a meeting for organization on April 7.

Mr. Holley in coöperation with Professor Thurston conferred with President Henry Morton of the Stevens Institute of Technology in Hoboken, N. J., with the result that Dr. Morton invited the holding of the meeting in the large assembly hall of the Institute, thus adding another helpful factor to the success of the movement. A photograph of this hall as it then appeared and before the later extensive alterations were even projected will be studied with interest.

Mr. Holley's call as chairman of the preliminary conference for the organization meeting was issued on March 15. It went not only to those represented at the February meeting, but to a number of others among the acquaintance of the committees who were likely to be interested.

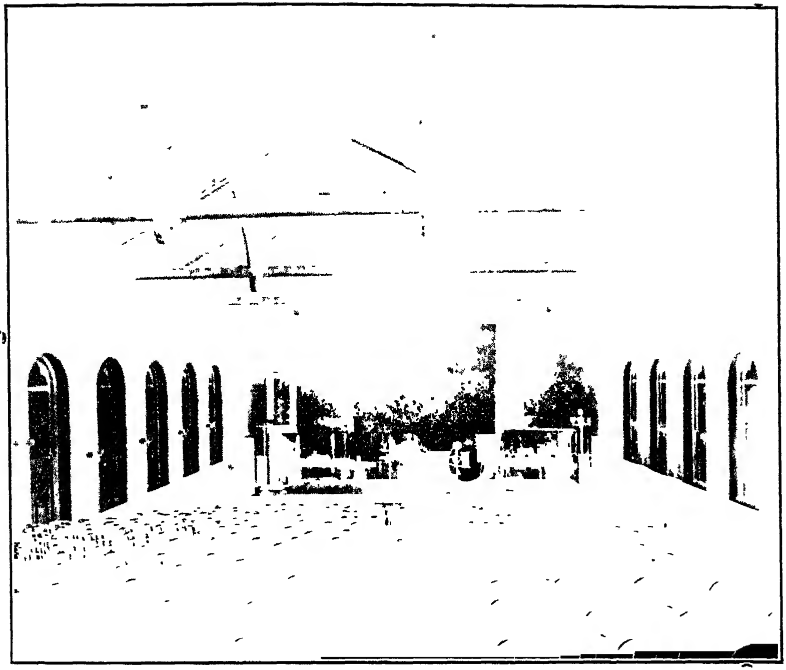
The meeting was called for eleven o'clock on April 7. Mr. Holley was detained by illness, but Mr. Henry R. Worthington took the chair, and Mr. James C. Bayles, editor of the *Iron Age,* was chosen to act as secretary.

Eighty persons responded to the call for this meeting, among them the following:

BACON, F. W.	BAYLES, J. C.
BAILEY, JACKSON	BOGART, JOHN
BALDWIN, S. W.	BRIGGS, ROBT.
BARNARD, GEORGE A.	BROWN, C. H.
BARROWS, WM. E.	BUCHANAN, CHAS. G.

Burden, Jas. A.
Church, Wm. Lee
Cloud, J. W.
Collins, C. C.
Copeland, Geo. M.
Cotter, John
Couch, A. B.
Davis, David P.
Durfee, W. F.
Emery, A. H.
Ewer, R. G.
Faur, A. Faber du
Firmstone, F.
Fish, John
Forney, M. N.
Galloupe, F. E.
Gill, John L., Jr.
Grimshaw, Robt.
Hayward, H. S.
Hawkins, G. C.
Hemenway, F. F.
Hewitt, Wm.
Hill, H. A.
Hoffman, W. H.
Hunt, R. W.
Isbell, Chas. W.
Jones, Washington
Keppy, Frederick
Leavitt, E. D., Jr.
LeVan, W. B.
Leverich, G.
Logan, W. G.
Lyne, Lewis F.
Mallory, G. B.
Melvin, David N.
Miller, Horace B.
Moore, Chas. A.
Moore, L. B.
Morton, Henry
Nason, Carleton W.
Newton, C. C.
Parson, H. E.
Pickering, Thos. R.
Porter, Chas. T.
Powel, S. W.
Richards, Chas. B.
Richards, F. H.
Robinson, S. W.
Rose, Joshua
Scott, John
Scranton, W. H.
See, Horace
Soule, R. H.
Sperry, Chas.
Stearns, Albert
Strong, Geo. S.
Sweet, John E.
Sweetland, W. L.
Tabor, Harris
Terry, Charles P.
Thomas, Ed. W.
Thompson, Chas. T.
Vanderbilt, A.
Wallis, John M.
Ward, John F.
Ward, W. E.
Webber, Samuel S.
Weightman, W. H.
Wells, Eben F.
Wheeler, F. M.
Wheelock, Jerome
White, Jos. J.
Wiley, W. H.
Wood, DeVolson
Worthington, H. R.

This list brings names from outside the narrower limits of the first reunion. Professor Robinson was at the Ohio State University at Columbus; C. H. Brown was the designer of the Brown Engine at Fitchburg; Frank Firmstone represented blast-furnace engineering around Easton, Pa.; James A. Burden was of the Burden Iron Works of Troy; J. W. Cloud stood for the motive power practice of the Pennsylvania Railroad; R. H. Soule was superintendent of motive power for the West Shore Railroad; Albert Stearns stood for chemical manufac-



ASSEMBLY HALL, STEVENS INSTITUTE OF TECHNOLOGY, HOBOKEN, IN 1880.
PRESIDENT MORTON ON THE PLATFORM

ng; Washington Jones, a veteran, and Chas. T. mpson, much his junior, represented I. P. Morris of adelphia; W. F. Durfee had been identified with iron allurgy and the early struggle of the Kelly steel pro-, and was then engineer for the Wheeler and Wilson ing machine in Bridgeport; R. W. Hunt was engineer the Troy Bessemer plant; S. W. Baldwin was agent the Pennsylvania Steel Company; Wm. H. Wiley was ex-railroad man with a war record as officer of llery, in which he had risen to the rank of major, was later to serve the Society as Treasurer for many as; Mr. Ward was making bolts and nuts at Port ster and was the first man to build and live in a ent concrete residence; Jerome Wheelock was build-engines in Worcester; Horace See was winning fame shipbuilder in Philadelphia; Robert Briggs of Phila-phia had established a standard pipe thread and em of pipe fittings; Geo. S. Strong was planning his ugated locomotive firebox and his complicated but nomical valve gear; David P. Davis was shortly to be harge of the engineering of the telephone and its ex-nges; Harris Tabor was soon to bring out his im-vement in the steam engine indicator, the second not- advance in it since Chas. B. Richards had changed its n from the early design, in order to meet Mr. Chas. T. ter's need for an instrument to test the distribution team at high rotative speed, and following the work Ir. Joseph W. Thompson of the Buckeye Engine Com-y. There were others also who had won distinction, n in his own field. Mr. Charles A. Moore represented business end of the profession, at the head of a suc-ful supply house, distributing manufactured engi-ring products and contracting for engineering instal-ons.

In his opening address, Mr. Worthington reported decisions reached in the conferences which had pre-ed the meeting. The first was that a policy of broad rpretation of the troublesome problem of eligibility membership had been settled by ruling against a

specific wording of qualifications, leaving the Council free when acting as a membership committee to settle each case by itself. The Society did not create a Membership Committee for many years (1904), but the Council had one for its own convenience long before the Constitution recognized it and fixed its method of procedure. The policy of broad interpretation of the eligibility requirement has been one of the corner-stones of the success of the Society. Nothing could have been more fatal than the forcing of a Procrustean uniformity of training and experience.

The other policy was that of recognizing that the governing Council of the Society should be the persons who would know best whether the Secretary of the Society when he was found, was a person whose methods were building up the Society or blocking its progress. If he was elected by the Society at large, it would be difficult to make changes which the best interests of the Society might require, without a publicity for the reasons for such change from which both parties would shrink. On the other side, gusts of prejudice or favoritism among the voting membership should not be capable of unseating a Secretary simply by the processes known to skilful and assiduous electioneering. It was best therefore to take the office of the Secretary out of Society politics, and make him the appointee of the elected officers who form the Council. The Council also, having definite administrative responsibility as well as legal obligations, would be cautious and painstaking in choosing their executive to a degree which the irresponsible voter at large could neither recognize nor live up to. Subsequent experience has fully justified the wisdom of this decision, and the plan then inaugurated has been the example of all later organizations.

The Committee on By-Laws then presented its report through Mr. M. N. Forney. There seems little doubt that these rules were drafted by Mr. Holley, and sent for criticism to his colleagues, and found acceptable by them. The ideas embodied the successful features of method in

use by the then existing engineering societies, with the additions and changes to meet the special group of conditions. It may be said in the light of later knowledge and experience that they did not differentiate between the organic law of such an organization, and the detail of procedure under it. The headings were: (*a*) objects, (*b*) membership, (*c*) procedure of election, (*d*) fees and dues, (*e*) officers of the Society, (*f*) procedure of election of officers, (*g*) meetings, (*h*) papers, (*i*) amendments. There was a wise simplicity about them, and some features deserving special comment will be reviewed in a later chapter.

At once an interesting question arose in this gathering of eighty men. Who were qualified to vote on the adoption of the proposed report and its rules for conduct of the Society, and who could vote and elect the officers to be reported as recommended by the other committee soon to be heard from? The question was discussed back and forth, until Mr. W. F. Durfee arose. He was a distinguished student of antiquarian Americana, and stated that the method followed by pioneer pilgrims could be presented in the following syllogism:

Major Premise:	The highest authority states: "The earth is the Lord's and is the inheritance of the Saints."
Minor Premise:	*We* are the Saints!
Conclusion:	There could be no question to whom the earth belonged.

Amid much laughter the meeting decided by a rising vote that all who were then present and those who had attended or sent letters to the preliminary meeting and who subsequently qualified by paying the required initiation fee of $15, were proposed by the Committee on Organization as charter members and were entitled to vote. The Rules were thereupon adopted, and made the organic law of the new Society. This adopted the name of the Society, also as incorporated into the first article.

The Committee to nominate officers for the first year under the adopted Rules had sought a name for president which should stand for achievement in mechanical

engineering which was conspicuously American and which should be so recognized abroad. The one preëminent person in this group was Mr. Geo. H. Corliss of Providence, R. I. He had introduced a trip-valve gear in 1849, and had many successful mill installations as well as notable steam economy to his credit. His valve gear had been copied and modified and re-designed in all industrial Europe, and an important engine builder of Belgium had received an exposition medal "for his successful adaptation of the inventions of one Corliss, an American." But the juncture was an unfortunate one. Mr. Corliss had just had an unpleasant experience in relation to an acceptance of an engine and was vexed with the representatives of his profession. He did not coöperate easily with colleagues by temperament; and his letter of refusal of the honor would have been called "sassy" by the irreverent. Messrs. Holley and Sweet with characteristic modesty refused peremptorily to undertake the duty of representing the new movement publicly and of making such addresses as the new president must be ready to make. Hence, the choice fell upon Prof. Robert H. Thurston, a naval engineer during the Civil War, with an engine-builders' training ashore, the author of textbooks of acceptance and repute both at home and abroad, and then the head of the engineering department of Stevens Institute of Technology. Always ready in speech, felicitous in expression and much beloved for his genial personality and tact, he made an ideal choice for the difficult first year. The full ticket presented by the Committee was as follows:

PRESIDENT

ROBERT H. THURSTON

Stevens Institute of Technology, Hoboken, N. J.

VICE-PRESIDENTS

HENRY R. WORTHINGTON	New York
COLEMAN SELLERS	Philadelphia, Pa.
ECKLEY B. COXE	Drifton, Pa.
QUINCY A. GILLMORE	U. S. Army
WM. H. SHOCK	U. S. Navy
ALEXANDER L. HOLLEY	New York

MANAGERS

Wm. P. Trowbridge	New York
Theo. N. Ely	Altoona, Pa.
John C. Hoadley	Lawrence, Mass.
Washington Jones	Philadelphia, Pa.
Wm. B. Cogswell	Syracuse, N. Y.
Francis A. Pratt	Hartford, Conn.
Charles B. Richards	Hartford, Conn.
S. B. Whiting	Pottsville, Pa.

TREASURER

Lycurgus B. Moore	96 Fulton Street, New York

It was understood that Mr. Lycurgus B. Moore, treasurer of the American Machinist Company, elected Treasurer of the Society, should continue to act as its Secretary and without compensation, as he had been doing during the preceding months, until a successor should be chosen.

This first ticket shows also Mr. Holley's administrative hand, and his first memorandum of recommendations has been modified above only in one or two exceptions. The representative character of the persons chosen will be apparent: Messrs. Thurston and Trowbridge stood for engineering education; Messrs. Sellers and Pratt for the machine tool designer and builder; Messrs. Coxe and Whiting for the mechanical engineering of mining; Messrs. Holley and Cogswell for metallurgy and chemical engineering; Messrs. Hoadley and Jones for the builders of engines large and small; Messrs. Ely and Richards for the railway and the manufacture of small arms; Messrs. Gillmore and Shock for the achievements of mechanical engineering in the army and navy.

The meeting then adjourned, referring to the Council, which consisted of the newly elected officers, all details to be considered, and the arrangements for the first professional meeting in the autumn.

The next step was the promotion of membership and the discussion of policies in advance of such a meeting.

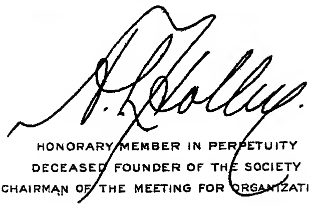
CHAPTER IV

Some Principles of Society Philosophy

The original rules of The American Society of Mechanical Engineers, as provided by Mr. Holley at the meeting of organization on April 7, 1880, incorporated and formulated certain principles which were in fact a philosophy for the conduct of such a body. Around these standards the years have developed additional interpretations or deductions by a process of normal growth. Some of these it may be serviceable to emphasize.

The Rules of 1880 were slightly amended from time to time, notably in 1884, 1894 and 1904. The most significant change was that of 1894, whereby the dues of all members were increased by $5 per year. The Junior dues were raised from $5 to $10 and the Member's dues from $10 to $15. The initiation fee was increased from $15 to $25 for Members and from $10 to $15 for Juniors.

The original policies of administration were not amended to any great extent until 1904. At this time and after a year's work of an important and assiduous committee, of which Messrs. C. W. Hunt, Henry R. Towne, R. H. Soule, Jesse M. Smith, D. S. Jacobus, Geo. M. Basford and F. R. Hutton were members from time to time, a new instrument was created and submitted to the Society in which was recognized the distinction between the fundamentals of Society law capable of amendment only by vote of the entire membership after exhaustive discussion and full apprehension of the issues involved; and another group of standards of procedure which should be capable of more easy amendment. The standards of the first group were called the Constitution. The standards of the second group were called By-Laws and were created for the guidance of the



HONORARY MEMBER IN PERPETUITY
DECEASED FOUNDER OF THE SOCIETY
CHAIRMAN OF THE MEETING FOR ORGANIZATION

officers charged with the administrative conduct of Society affairs and of the members where they come in touch with it. The By-Laws would be amendable by the Council but without consulting necessarily the membership at large, whose interests and rights would not be affected by such changes. There was also a third group of precedents and standards aiming to secure uniformity in the way in which office and convention business was carried on.

The revision of 1904 introduced also a great change in policy and principle whereby the duties of Society administration would be apportioned among a group of Standing Committees. Previous to this the policy had been to make the Secretary of the Society not only the executive of the legislation by the Council, but also a sort of prime minister originating policies and recommending them for adoption by the Council. This made the Secretary something of a foster brother in a large family. But the great growth of the Society about the beginning of the twentieth century made the time seem ripe to change from the personal to the more official conduct of Society business. With this exception and without attempting to make the discussion conform to any historic succession or any contemporary character as to developments on different lines, the following headings will be referred to in detail:

(*a*) The membership, grades and qualifications
(*b*) Presentation of papers at meetings
(*c*) The Journal
(*d*) The copyright of papers presented at meetings
(*e*) The danger of self-advertisement in papers
(*f*) The procedure at Society meetings
(*g*) Registration at meetings; program
(*h*) Entertainment of the Society at meetings
(*i*) The banquet at conventions
(*j*) *Vive voce* legislation at meetings
(*k*) Standards created by committees
(*l*) Insignia of the Society, seal, badge, diploma, card
(*m*) Necrological notices.

THE MEMBERSHIP, GRADES AND QUALIFICATIONS

Broadly speaking there are two great philosophies under which a national society of professional men may be organized. While the distinction is not exact and to this extent misleading, the one philosophy may be called British and the other German. The British philosophy seeks for a professional solidarity which can be secured only by a union of membership reasonably homogeneous in character. It seeks to have membership in the organization a sort of "cachet" or guarantee of a high standard of professional qualifications. This implies a rigid scrutiny of the achievements of all candidates for membership in the Society before they can be admitted. It carries with it a minimum age limit in order that professional reputation shall be secured before the candidate applies for membership. It involves a loyalty to an organization national in character which shall be superior to any adherence to local groups or sections, if such there be.

The other, which has been called above the German philosophy, is that the engineering society is a great publishing association whose prime function and purpose is the procuring, printing and circulating of professional literature. The members are subscribers to this expense of publishing, and accomplish by their union what individually they could not do. There is less adherence to the ideal of professional achievement, but rather to the advantage of frequent local assemblies for exchange of ideas and for the mutual advantage which is supplied most effectively by organizing sections or groups or branches, which will meet frequently and will be made up of members of kindred interests. There is, of course, a middle path where both ideals are sought and where a library and a center of influence will be the obvious functions of central executive offices and the national body will seek to secure the advantage from the strength of the constituent units.

The founders of The American Society of Mechanical

Henry R Worthington

HONORARY MEMBER IN PERPETUITY

DECEASED FOUNDER OF THE SOCIETY

gineers selected the first ideal and purpose, and have hered thereto. It has made the candidate for member-p in the Society undergo a strict scrutiny on the basis a proposal backed by five Members. After scrutiny by Committee on Membership, the name of the candidate published so that if anything is known which is unfav-able to such candidacy, it may be revealed under proper nfidential safeguards. At first the voting on members s carried on by letter ballot with full information as professional achievement. The practical and economic ficulties connected with this method of election in a iety of large size, due to the cost of election, printing d postage, have induced a change whereby the final ion is taken by the Council of the Society.

Grave difficulties faced the organizers of the Society deciding upon the criterion of eligibility. The condi-ns of production in the United States are different m those in Europe. The Society came into being when manufacture of standard products of special ma-nery and the use of jig and template, combined with ine subdivision of labor, had proved its economy by its cessful operation in New England and elsewhere. The nufacture of gun parts, sewing machines, locks, type-iters, bicycles and the like, leading up to the manu-ture of steam engines, machine tools and locomotives that principle, had made it clear that commercial suc-s lay in eliminating the special design of each unit, iting the number of sizes, and substituting for contract nufacture, the production and sale of large numbers of plicate units, uniform and standardized. The principle s insisted on that the buyer was not to be allowed to dify the standard of the seller by imposing his whim to form or his preference for personal originality in rangement. The principle, however, had not been rmulated at the time as that of the American system production, that it was the seller who created the ecifications for the product which he submitted to the yer. The other and older system still largely prevalent Europe, is to have the buyer write the specifications

and send them to the producer to bid on. The buyer and his engineer, as consultant, are expected to enforce such requirements on the manufacturer as to productive processes as the engineer might impose.

This economic principle that economy of production lies in making a standard product which is ready before it is sold or contracted for, has had an effect on the work and duties of the mechanical engineer in America in many directions. He is less of a shop craftsman and more of a worker with his brain, a creator and an executive. He is less an office practitioner and more a responsible scientific leader in the production process itself. In fact, the consequence of the great aggregations of capital which have been a feature of American progress has been to force the corporations to employ the entire time of persons of ability and experience who fifty years ago would have been serving as consulting engineers for many individual producers but in the exclusive service of none. Thence it follows in modern practice that an increasing number of mechanical engineers will be combining machinery already designed by others, and will be to a less degree creating for themselves from the lowest unit up to the aggregate machinery of the plant as a whole.

The founders of the Society foresaw this tendency with rare clearness of vision and shaped their policy accordingly. The Society would have been a small one and of limited influence had its membership been restricted to the type of consulting or creative engineer alone. The factory engineer is more and more a manager of men, and for him the various developments of his great plant are the tools of his professional achievement. The engineer must be what he is often called, a business man.

Furthermore, there was a duty owed by the Society to the Juniors in age and engineering experience. The Society means more to a Junior than his membership or his dues or his capacity to contribute papers can mean to the Society. This grade must exist also to provide for the recent graduate of the engineering schools to whom

Society membership and its privileges of acquaintance with the leaders of the profession and of visits to engineering centers will have the greatest value. Later (1907) came the idea of the Student Branch whereby the candidate for an engineering degree can be enrolled in the Student Branches of the various engineering schools and universities, with the privileges of a badge (1909) and a subscription to the monthly Journal of the Society.

The Associate grade was first established to fit the needs of the business man, not an engineer, who was interested and desirous of coöperating with engineers by reason of his financial and commercial relations. Later the idea was extended (1908) to include also engineers who were in important positions but too young in years to be eligible to the Member's grade. Editors were also elected to this grade, patent experts and attorneys, and some teachers of engineering. Still later the embarrassments from this double use of the term of Associate brought about the creation of the grade of Associate-Member (1912) to meet the case of a man in too responsible a position to be classed as a Junior, and by age and duties not yet in the full Member's grade. Under this policy the Associate is not supposed to be eligible for transfer to the Member's grade.

The Member's age was put at thirty years as a minimum limit in 1890, and in 1914 was placed at thirty-two years. A later qualification or precedent introduced the idea of sole and responsible professional charge of work as necessary for the Member. It was explained that such responsibility in general meant that the member did not as a rule have to submit his professional work to a revision by an official superior who could thereby make himself responsible for the excellencies (and also for the defects) of the Member's professional work.

The early rules provided originally that Members had to be proposed by three and seconded by two others in the same grade. The seconders did not have to know the candidate but must have confidence in the work of the proposers and approve their action. In 1890 it was ruled

that the entire group of five proposers must know the candidate well enough to answer urgent questions as to his eligibility. Juniors were proposed by three members only and no seconders were required, a plan which still remains in force.

The Council was at first a committee of the whole on membership. A sub-committee of the Council was appointed about 1888 to scrutinize the applications and endorsements of the proposers before the names were submitted to the full board. Such subdivision was made imperative by the increasing volume and importance of Council business. This sub-committee on membership in the Council was developed into the standing Membership Committee by the revision of the Constitution in 1904.

The duty of electing members to the Society by letter ballot was given to the Members and Associates by the first rules. The policy was a middle course between that then followed by the Civil and Mining Engineers. It made the voting membership primarily responsible for the quality of the enrolled membership. It exposed every candidate's professional record to a scrutiny as of Argus' eyes. It was a measure of popular and democratic control and government. Lists of names only were sent out at first; later the record of professional experience was appended to each name. Finally the professional service sheet was made a separate document from the ballot list so that those interested might retain these biographical notices for their information and for future use.

The last stage which is in operation at this writing is the procedure of voting members into the Society by the Council after the membership has been advised of their candidacy in The Journal and opportunity has been given to show cause why such persons should not be admitted. The candidate will then pass four scrutinies: his proposers must act first, then the Committee on Membership, then the members at large, should they desire to do so, and lastly the members of the Council who will

cast the final and declarative ballot. This plan saves much office expense in printing and postage; and with the great numbers now on every ballot, it is believed that it secures equal if not even more effective scrutiny.

At first two negative ballots and later seven cast against a name prevented an election. There have been very few cases where the right of the member to cast a black-ball has been used to work out a grudge or obtain revenge for some alleged wrong. While a provision has always existed to enable the Council to right an injustice in an adverse vote, an experience of some years has shown that the membership has usually been right where it exercised its strength in this way. When the membership voted on candidates, a negative vote of 2 per cent of the ballots cast would defeat an election.

The votes of the members were at first scrutinized by tellers appointed at the meeting of the Society after it had convened. There were advantages in notifying the member elected in time so that he might arrange to be absent from his work and attend the meeting then in progress. This resulted in the practice of closing the voting three or four days in advance of the date set for the meeting. The tellers could then be appointed in advance, the ballots counted and immediate advice could be sent to the candidate of the favorable action on his name. The meeting was formally notified by the tellers as though they had just acted under the previous system, and the procedure of election was consummated by a formal declarative act of the President to the meeting. The By-Laws in 1904 made the Tellers of Election appointees of the President for the Society year before their services were required and crystallized the former practice. For several years a number of ballots for membership were issued during the year and for convenience these were usually printed on paper of different colors so that there might be no confusion. At present the Council elects members at its monthly meetings.

Many members regarded the duty of electing members to the Society to be somewhat formal so far as they were

concerned, particularly when the practice prevailed which called for no act of the voting member except to return the list of names in an envelope by mail. There was a short period when the member was instructed to mark an affirmative cross in front of each name on the ballot. This requirement led to confusion and was abandoned for the simpler practice of making the affirmative vote one in which the name was left unmarked on the voting list. Formerly only about 20 per cent of the membership voted for candidates.

The first applications for membership were letters. The first printed form of application blank was a duplicate letter sheet 8 inches by 10 inches in size. The four-page note sheet was adopted in 1890. The applications of all members except the very earliest are on file.

PRESENTATION OF PAPERS AT MEETINGS

The original method of presenting papers before an audience was the reading from a manuscript by the author or by the Secretary of the Society from the platform at the meeting. This may be called the "natural" method. If illustrations were required, the author or the Society had wall diagrams made on paper or linen with greater or less elaboration, or the author crudely made the necessary sketches upon the blackboard which must always be an article of platform furniture. An early apparatus for diagrams was a map frame to carry spring shade rollers and on the rollers was a black silicate surface on which the diagrams were painted in white lines. These diagrams were a great burden and expense. There were many assembly halls ill-adapted for their exhibition because the walls must not be defaced. Many meeting halls are badly lighted, particularly in the day-time, so that many persons could not see charts. There was often little time for the draftsman to make wall charts before the meeting and in any case they must be reproduced again for the Transactions and any technical journals wanting to use them.

Little argument is required to present the disadvantages of this system. The tedium of prosy reading is hard to bear. Many engineers are not trained to read pleasantly or to fill large halls with the voice. Mathematical papers cannot be followed even by experts. Intelligent discussion is marred or diluted by a failure to grasp exactly what the author says. There were few copies, or only one for use by the journals who might desire to republish.

The argument for the system is that the content of the paper is presented to the listener for the first time at the meeting and is therefore a novelty to him. He must attend in person the meeting where it is read if he wants to hear it. The meeting is therefore alleged to offer greater attraction than under the plan of printing and distributing the papers by mail previous to the meeting. On the other hand if intelligent discussion is the object sought to make a meeting interesting, the participants in debate should have an opportunity to consult their records and data on the topic in question before leaving home, and far more valuable contributions will be made if the proposed discussion is elaborated under more favorable conditions than on the floor of a meeting.

The first steps of progress away from the natural method were taken when the second Secretary of the Society was elected in 1883. The papers were set up in galley form for the Cleveland meeting in that year by the Society's printer and were brought in this shape to the convention for those present to read and study. The paper was read in full as before and there was no advance distribution, but every one interested had a copy in his hand. This move was enthusiastically approved by the journals. Accompanying this manifolding of the text was the plan of reproducing the drawings or diagrams by photo-engraving processes or redrawing by the wax process from blueprints or photographs. The half-tone or Ives engraving process was then just coming in. These cuts were made as for the book illustration of the paper when published and prints were made in a sufficient

number to distribute to every one at the session when the paper was read. The journals were allowed to have reproductions from these blocks at their cost, plus 10 per cent. The wall diagram had disappeared and every member could study the clear illustrations closely. For discussion *viva voce* the blackboard, however, must remain, and contributed discussion could rarely be illustrated for lack of time. These two moves were enthusiastically approved by the journals. They now had all that heart could desire except the text of the oral discussion at the meeting, which they had to secure laboriously for themselves.

The following successive steps of method of presentation of papers after this were easy and unavoidable:

(*a*) The printing of the paper and its illustrations as for the Transactions in pamphlet form; and having these pamphlets on hand at the headquarters of the meeting, to be taken by the members and also distributed at the full reading. All members present received both paper and diagrams.

(*b*) The distribution of such advance pamphlets by mail to those members who said they would be in attendance at the meeting. So many members left their papers at home and had to be supplied with additional copies at the meeting that there was duplicate distribution at each session as in the first case.

(*c*) The advance distribution by mail to all members of the Society whether they had or had not announced their purpose to attend the meeting or made any requests for such pamphlets. This involved also the necessity of a second distribution of copies at the meeting.

This system compels authors of the papers at any meeting to send in their manuscript and illustrations usually thirty days in advance of the date of the meeting. Some authors find it temperamentally difficult to turn out work except under the pressure of the last limits of available time. But this system may be regarded as the high water mark of the philosophy of securing well-considered

R. H. Thurston

PRESIDENT 1880–1882

OF

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

and pointed discussion of papers by interested experts. In comment on this system it may be said in its favor:

(*a*) Every member gets his Society papers fresh from the press as soon as they are issued

(*b*) Every member is treated alike by an automatic process and those residing at a distance get the same return in the matter of papers and publication matter as those who reside close to the Society headquarters or to the place of meetings and reading

(*c*) Every member is relieved from exertion to take action in order to get his Society papers

(*d*) Well-considered discussion with data from sources of reference in a library or works is stimulated

(*e*) Discussion can be invited from persons particularly qualified to speak who perhaps are not to be present in person at the meeting or may not be members of the Society at all

(*f*) The tedium of full reading of the paper becomes unnecessary, particularly if the voice is monotonous, slow and hardly audible. If this plan is followed, the paper can be presented in abstract or by title and the time so saved can be devoted to live discussion

The considerations in opposition are:

(*a*) It is costly in regard to paper, presswork and postage

(*b*) All papers are not of equal interest to every member; to send papers which do not interest a member and which he consigns to waste is extravagant and foolish

(*c*) If all papers are read by all members before the meeting, the charm of anticipation and novelty is dissipated. Why should a member attend a meeting for the presentation of papers when he can in his library more cheaply and with less exertion taste what the meeting is to set forth?

In weighing these advantages and attendant drawbacks, the Society has regarded that the stimulus to discussion of advance distribution outweighs by far any of its disadvantages. Next to that was the saving of time and the stimulating of interest in a liveliness of discus-

sion for which time was allowed and which came fresh from the attrition of minds in conference.

As an administrative question this system of advance distribution and full oral discussion meant that the text of all papers printed before the meeting must be kept standing in type after the meeting until all contributed discussion had been revised and such revised form had been sent to the author for his closure of the debate. The entire membership therefore did not receive the complete revised debate until the bound volume was distributed, although any member could have reprints from the combined papers and discussion when the plates were made.

The method of revising the stenographer's report of discussions at the meeting was to have him make his typewritten report in duplicate at first and later in triplicate. One copy was kept as the Secretary's original. The duplicate was numbered by paragraphs in parallel with the original and was then cut up and classified by the names of the participants. Each participant then received his share by mail and might correct or rewrite what he was reported to have said. Three weeks were usually allowed to the debating members and a week to the author. Hence the first complete papers which had been discussed were ready to be sent to the printer about one month after the meeting had closed.

THE JOURNAL. THE TRANSACTIONS

By the system discussed above, the papers and their discussions were sent to the members on request or as a matter of routine. Other communications from the Society's office, covering news items, dates and programs and routine communications of general interest, were individually circularized and sent by third-class mail as often as necessary or desirable. These were items of expense for job printing, and the pamphlets could not demand the second-class rate or regular postage which would be given to stated issues to subscribers.

In 1907-1908 the Society created its Journal of ten

or twelve issues in each year. It was intended to effect the distribution of all papers to all members as by all previous pamphlet processes, and in addition to secure prompt issue and distribution of all contributed discussion as soon as read without waiting for the complete paper; and also to be the channel of communication between the Society headquarters and all members on all professional matters of Society concern. This included pretty much everything which had hitherto been transacted by circular letter, leaving in the individual class only the procedure of election of officers and communications relating to the collection of income. By the fact of stated issue the second-class postage rate could be secured and a considerable economy effected. The Journal could also become a publication worth while to non-members in a subscribing class, and thus again enabled to undertake new functions of usefulness to the membership. Among these directions of activity for The Journal may be listed:

(*a*) Editorial report by the Secretary of the Society to its members and others on the activities in progress and incidents at headquarters with comment thereon. This will keep members at a distance in touch with the Society and maintain the warmth of their interest in its affairs and welfare

(*b*) Editorial comment and report on current incidents outside of the Society but along engineering or allied professional lines. This will be of greatest significance to designers and those making scientific research.

(*c*) Editorial or direct intercourse between members through the Society office, in topical discussion, query and answer, and brief record of fact or procedure for the common welfare

(*d*) Digests or short summaries of papers presented before other societies at home and abroad, and particularly translations from papers in foreign languages appearing both in periodicals and in transactions or bulletins

(*e*) Bibliographies or summaries of literature in

books and periodicals on particular topics and engineering matters, especially indices of selected topics

(*f*) Book reviews and criticisms

It has not been possible at the time of the preparation of this paragraph to enter upon all of these lines of activity, but the summary of papers from foreign periodicals has been regularly issued, and with the practice of giving so far as practicable the data and results embodied in the original paper instead of a mere description of their contents. As the library of the Society shall be developed and particularly the concept of the joint library of all engineering societies under the Trustees of the United Engineering Society, the usefulness of The Journal can be greatly increased, making it a directory of engineering information along professional and technical lines. The Journal will always be differentiated from the commercial or trade newspapers, in that the latter will be specialized as news distributors respecting enterprises or products, dealing also with the commercial side of the profession. The time or novelty element enters also into the activities of the trade newspaper. The Society Journal on the other hand will also be sought in its highly developed state by persons not members of the Society, serving in this way to make its work and value more widely known.

Furthermore, The Journal, or reprints from its pages, can be used at meetings of the Society, at meetings of Student Branches, geographical groups or professional sections. It will doubtless before long contain engineering matter which there will be no time to present and discuss at even the multiplying number of reunions of members in the various cities.

The increasing circulation of The Journal by the increase of membership and the growth of the subscribers' list opened the door to the canvass for advertisers in its issues and the attendant income devotable to Society uses and needs. This became at once a commercial success, since The Journal is in a distinctly preferred class, as it is not thrown away at once or remains unread, but

is in the class which remains upon desk and table ready to be consulted, not once but frequently. The types of the advertisements included are: Power plant equipment, power transmission, hoisting, elevating and conveying machinery, industrial railway equipment, metal working machinery, machine shop and foundry equipment, pumping and hydraulic machinery, electric power equipment, air compressors and pneumatic tools.

The keynote of the work of the Society in connection with advertising in The Journal has been to render service to the advertiser. It was felt at the outset that anything resembling an effort to induce manufacturers who were members of the Society to advertise, simply because they were members, would be taking an unjustifiable position and one subject to severe criticism. This view early led to the adoption of what has been called Condensed Catalogue pages, which consist of engineering data from the catalogues of manufacturers, paid for and inserted among the advertising pages of The Journal and later distributed in book form. When thus issued they constitute a convenient desk book for reference, covering a wide variety of appliances and giving sufficient information for preliminary layouts of mechanical plants without having to consult manufacturers' catalogues.

Various other useful plans have been followed, among them the preparation and issue of Directory Cards, convenient for reference and containing brief statements of the main products of different manufacturers. The business of the advertising department is done mainly by correspondence.

The Transactions is the official name of the bound and indexed volume of papers with their appended discussions which are the result of the assembling of the members at Society Meetings. They embody for reference and record so much of the work of any year as the Committee on Publication decides to be worthy of such permanent preservation. At present it is limited to one volume a year, but its inconvenient size and weight is likely soon to lead to the issue of more than one. It is

bound in half morocco and is sent to every member of any grade. The value of the Transactions has been the great claim of the Society for recognition outside of its own members, and it is the glory of the Society that they should have been kept all through the years on an elevated plane.

Monographs have been issued in addition to the Transactions, perhaps the most notable of which is the Autobiography of Mr. John Fritz, Honorary Member and Past-President of the Society. This is the first of what it is hoped will be a creditable series of such Society publications through the years.

THE COPYRIGHT OF PAPERS PRESENTED AT MEETINGS

A problem or principle to be thought out arose as soon as papers began to be submitted to the Society. The question was threefold:

(*a*) Should the Society reserve to itself the copyright of author's papers in all their forms of publication

(*b*) Should the author have the right to reserve to himself any financial advantage from his labor in preparing the paper that it might be presented through the Society

(*c*) Should the technical journals have the right of republication of such papers in their current issues immediately after the presentation of the paper before the Society without invading the copyright obligations of any of the three parties interested

The Society should plainly have control over the use to be made of papers read before it. It should not be used as a medium of advertising business interests; yet on the other hand its reputation would be extended and its influence exerted for good if in addition to the official publication in a pamphlet or in a bound volume, a paper could also be made to reach the thousands whom the technical magazines serve. The author's principal return from a scientific paper should be in reputation and the recognition of good work by his colleagues. It is often the case on the other hand that the research or the

conclusions which the paper embodies may have cost the client or the corporation who has authorized and financed them a sum on which they may consider themselves entitled to an interest. Some will not regard a reputation for breadth of view as an asset which a corporation can capitalize.

The technical journals took a keen interest in the discussions on amendments to the rules which should wisely dispose of this question. Dr. James C. Bayles, then editor of *Iron Age* and associated with Mr. David Williams, was a principal advocate of the broad policy of widest publication. It was finally settled that the Society was to claim no exclusive copyright except in the form of the completed bound volume of the Transactions; but that the privilege of immediate republication of papers read and discussed before meetings of the Society should be allowed to those who might desire to do so. This policy precluded the practice of an author's selecting the journal which should first publish his paper to the disadvantage of others. It was left to the Secretary to see that all journals were treated alike. This necessity led to a policy adhered to for many years and first recommended by the practice of the *American Machinist,* that there should not be appointed to service on Society committees or to office in the Council, any representative of technical journalism. This was not so much for fear of any undue advantage to such a journal from an intimate knowledge of Society affairs, as to prevent any feeling on the part of other journals that there might be such advantage to the person so appointed. With the growth of the Society this practice fell away, and later methods of publication and the growing strength of the journals themselves made this form of the problem of no significance.

THE DANGER OF SELF-ADVERTISEMENT IN PAPERS

Business or commercial interests could not fail to see what neat, effective and unobtrusive forms of advertising would be offered by having the matters in

which they were interested presented in papers before the new Society. This recognition may take form in many ways, beginning with a pressure upon their engineers to keep in the area of strong illumination by the frequent offering and reading of good papers, down through less defensible methods to the frank advertising write-up of a new invention, product or design. It is not defensible to say that a paper will not be accepted from an engineer who is financially interested in the subject which he presents, or who is in the employ of such persons as their designer and creator of solutions of new problems. It is often the case that the men are best informed on any subject whose business makes them so. The Society needs and in debate will ask for just the knowledge and experience which producer and user are best qualified to furnish. If the opposition to personal interest was adhered to, the difficulty would be dodged by having the paper chargeable as an advertising or promoting contribution presented by some other member who could not be charged with having a personal interest. In the same group of problems is that offered when the monopoly of the patent system has been secured for the design and invention of the product so that rights to use it can only be secured through the patentee. Shall this Society refuse papers of real value because some one may be commercially or financially benefitted by their reading?

The first principle to be adopted was that papers should not be accepted which discussed new propositions as yet untried in practice. This ruled out processes not scientifically sound, inventions which could not be made to work, and mere ideas. Once in a long while through the years a great invention will come before the Society in a paper which it will honor that body to accept before it has been put to the crucial test. Such was Sir Henry Bessemer's paper on his New Pneumatic Process for Making Steel. Should such a rare case arise, the precedent may be well departed from, but in general the re-

E. D. Leavitt

PRESIDENT 1883

OF

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striction is sound and should prevent the Society and its standing from being used as factors to enlist capital by persons of the promoter class.

A second and broader requirement was that the paper must present facts and data of scientific value and not merely opinions or commendatory language by an author. Some trade catalogue literature would fall under this last heading, but a trade catalogue which presents reliable scientific facts and data becomes professional literature. Hence, the form in which the paper appears will often have more to do with its acceptability than a conformity to an arbitrary standard as respects its contents.

A third and broader and perhaps more comprehensive principle has been that a paper which embodied an application of a newly discovered law, or a new application of an old law, must necessarily benefit whoever is fortunate enough to avail himself of it. The greater economy or efficiency will be that which results from the closer conformity to natural law. The Society could not prevent the advantage sure to follow from the step of progress by refusing to accept the publication of the paper. Conversely, the Society could not help it if this step of progress worked to the disadvantage of those who would be left behind by the march of advancement. It is not advertising to make public a fact.

In many departments of applied science it costs money to make research into the facts which make for progress. Corporations make such investigations and research for their own interest and may properly claim that any advantage to themselves resulting therefrom is to be kept as their personal property. It is impossible to commend too highly the practice of some corporations which have directed their engineers to present to the world the results of such researches as contributions to progress along these lines, in the form of papers before the Society. It is not so long ago that material in this class would have been jealously guarded as an asset of its

originators. It might have been kept so had there been no Society to receive, value and record it. It is increasingly true that with the advance of professional standards, a man who seeks to use the Society for selfish ends and personal purposes or who allows himself to be so used, does himself and his interests more harm than good.

Belonging also under this same heading is the practice and philosophy as to the reprinting and sale of papers read and discussed which may be of commercial advantage to the author or to those to whom he is related in business. The Society has taken the same view referred to above, that it cannot be responsible for physical laws nor for the fact that for some one these laws are acting to advantage. No permanent benefit would be secured to competitors by suppressing the new discovery or adaptation; it would get out in other channels; and the Society is benefited by being itself a channel for the dissemination of facts of progress.

There are only two limitations. First, the publication must be complete, including the discussion, and without any garbling or omissions, so as to be in the form in which it appears in the official volume. It must include any points raised which may appear to work to the disadvantage of the topic under discussion. This is to maintain the judicial attitude as respects the matter and remove the possibility of a charge that the Society has lent itself to the work of advocating any one's interests. The other requirement is that the Society shall do the reprinting under its own formularies and headings, in its own type and under its own standards. The person benefited may print separately any introduction or foreword and insert it as a leaflet if desired, but such transmittal paragraphs must not be made a part of the paper, nor may the person benefited print the paper *as a paper* with its own headings and in its own type. The reasons for these restrictions will be apparent; the policy has worked safely and well.

THE PROCEDURE OF THE SOCIETY MEETINGS PROGRAM

A convention of professional men, members of a national or international society should have at least the following five sides to it, or as many of them as possible:

(*a*) The professional side, involving papers and discussions and Society business.

(*b*) The social side, giving members a chance to meet their colleagues and acquaintances. This is particularly significant to the younger men, and the older men owe it to the younger to favor it.

(*c*) The visits to engineering or industrial productive plants.

(*d*) The hotel side, involving comfortable housing and food.

(*e*) The excursion side, involving visits of a non-professional sort to points of scenic, historic or other personal interest.

The extremes of the above list are, at one end, the compact series of professional meetings, three sessions for papers in each day, unrelieved by any relaxations outside of the convention hall, and at the other extreme the so-called "junket," when the members come together for a good time, all frolic and social intercourse and excursions, and the reading of papers is made a secondary feature or forgotten in the pressure of other occupations. Wisdom lies in a safe middle path, where the enthusiastic devotee to engineering, earnest in his determination to get all he can from a meeting, shall not feel disappointed because the meeting was a frivolity and he has wasted precious time; and where, on the other hand, he who seeks relief from the exactions of his office shall not feel that he has only changed his latitude and longitude, but is in the same high-pressure atmosphere as before. Plainly, however, if anything is to be omitted from an over-full program of a meeting, it will be the non-professional excursion.

The attitude of a society towards the proportioning of these elements will be greatly affected by the presence

or absence of the ladies of the families of members. The American Society of Mechanical Engineers has favored the presence of ladies at its meetings from the very beginning. It followed in the first instance the precedents of the Civil and Mining Engineers. It did so for the pleasure of all parties in their presence. But as time went on there emerged certain advantages from their presence amounting to a philosophy of Society management. Among these were:

(*a*) The woman is the social factor in the life of most busy men. She keeps track of things the man will forget. She has time to devote to amenities involving sacrifice of her energies which he finds it difficult to make. She keeps alive acquaintance and friendship which he is prone to neglect.

(*b*) The woman's pleasure in the Society meetings will be an argument to bring the member with her, when he would perhaps otherwise allow pressure of other reasons to prevent his attending. A man's wife is thus an agent of the Society to secure his bodily presence and participation in discussions to which he is particularly competent to contribute in a valuable way.

(*c*) The feminine influence of the right sort is always a restraining one, keeping the atmosphere of the meetings on a high level and preventing the noise and vulgarity to which some men descend when they forget to restrain themselves and when they are just a lot of men together.

(*d*) The only argument against the presence of women at the meetings has been that as a class they are self-conscious as to differences in wealth or permissible expenditure for ornament or dress, in culture and in social position, to an extent which men ignore or which does not exist for them. So far as differences in education are concerned, these distinctions are rapidly disappearing; so far as the other differences may have ever existed, they are of no account. The restraint of the men from smoking at banquets is a difficulty to be met by substituting some other form of social festivity for the

formal dinner. This will be referred to later in another connection.

Taking up now the general question of the proportions to be allotted to the five points of view of a society meeting, it may be said that if there were no professional papers there would be no occasion for a meeting. With papers printed and distributed to all members and possible participants in debate on them, the professional necessity for the meeting is for discussion and additional contributed matter on the topics of papers, and the recording of experience in the solution of the problems which the paper starts. At first the satisfactory solution was to give two-thirds of each day to papers and one-third to excursion experiences. That is, there would be a professional session morning and evening, and a visit to an engineering plant in the afternoon. If some social function was assigned to the evening, then the sessions for papers and debate would be held in the morning and afternoon, and the plant visit cut out. If the plant visit or excursion called for both morning and afternoon, it was always put at the end of the week's program and after the papers and professional discussions had been completed. Later, while keeping to the general philosophy of morning sessions for indoor sessions and of afternoon visits out-of-doors, the multiplication of sections and specialized topics has compelled synchronous holding of sessions in different rooms and halls, and the member must choose which of two or more papers under discussion at once he will prefer to hear. Synchronous sessions are held to enable many papers to be presented without extending the number of days which the complete program will require. They seem inevitable and are the normal method to follow where a wide range of topics and of interests is represented. They are costly to provide for, and require a specially equipped convention hall, or several of them.

For the success of the social side of a convention, seven factors have been found necessary and serviceable:

(*a*) A convention headquarters, preferably in the

hotel where the members are staying. Such headquarters form a rallying point, to which old and new members may come and register their names, find out who are in attendance and receive all bulletins and necessary papers, tickets, badges and the like.

(*b*) That so far as possible all members in attendance be housed in the same hotel.

(*c*) That such hotel be equipped with a generous and hospitable foyer where the members can lounge and smoke between the stated events of the program; or, if the hotels cannot furnish this, the same sort of opportunity may be given at the convention hall. It is tedious to sit for hours listening to papers and debate; to relieve this tedium, let the member leave the audience room and find relaxation in a corridor while the paper which does not interest or concern him is in progress.

(*d*) That the program be not arranged with such fullness that members are in breathless haste to be present on time at program assignment No. 2 as soon as No. 1 is concluded. A hasty meal in a crowded dining room with overburdened service, followed by a rush to be on time for the starting of an excursion does not favor the making of acquaintances.

(*e*) That one excursion or visit to a plant per day be provided (or a limited number of choices). For all members to go together to a point of common interest is much more serviceable than to have the party divided into a large number of divergent groups.

(*f*) That the arrangements be such as to favor a free circulation among the members of the party on excursions. This means that a trip by unit train or by boat is better than trips in carriages, motors or by separate trolleys.

(*g*) That some one or several people on a committee make it a business to see that strangers or members of limited acquaintance are introduced with tact and discretion, so as to be made to come out of the shells of diffidence or self-distrust into which shy people are prone to retire.

REGISTRATION AT MEETINGS

Perhaps no one factor has had more to do with the social success of meetings of The American Society of Mechanical Engineers than the development of its system of registering members in attendance at these meetings. Such registration has an official and legal significance so that there can be no question before the law as to the presence of a voting quorum, or as to the persons who took action on any question brought up at such meeting. Above and beyond this, however, in practical influence is the social advantage of effective enrollment.

At the first meeting of the Society in the autumn of 1880, registration was secured by passing a sheet of letter paper from hand to hand, with the request that each man present sign it. There was no office or headquarters of the Society at this meeting other than the convention hall, but at no one time was every member present at any particular session so that this system was unavoidably incomplete. This first roster of members present at a meeting has been framed and hung in the Society's rooms.

The next step was the preparation of a register book like a hotel register of guests. Members and guests signed their names, their home address and their location during the convention. The Society's registers under this system have been preserved and are interesting exhibitions of autographs of men of professional eminence.

The difficulty with the hotel register plan was the slowness of the process when a large number desired to sign the book at the same time. This kept members standing in line tediously and in many cases after the work of the convention had begun in the audience room. It was overcome in 1904 by the obvious expedient of registering on individual card slips, so that as many could register at one time as there were places or clerks at the registration counter. The registration slip was made with carbon transfers, at first autographically by

pencil, and later by the use of typewriters; this made the card catalogue of the members in attendance in manifold. The system has been in use ever since that year and can hardly be improved upon for the purpose in hand. It was devised for the very large meeting in joint session of the Institution of Mechanical Engineers of Great Britain with the American Society in Chicago and these details are due to Messrs. Louis A. Gillet and Francis W. Hoadley, with the Secretary of that period.

The convenience of having transcripts from the hotel register of members in attendance early suggested the plan of printed slip lists arranged alphabetically from the register list and distributed at headquarters during the course of the meeting, usually at three intervals. This enabled everyone to know at first hand who was present, but, of course, the individual could only be identified through some common friend or by the awkwardness of inquiry from some one who by chance might know both parties.

The good taste of the officers of the Society had been opposed from the start to the type of flamboyant silken banner which is often worn on the coat of members enrolled at a convention. The well-nigh faultless artistic taste of the French in 1889 had equipped the visitors to Paris and its exposition of that year with a lapel button of unusually aesthetic type. The Americans were not slow to appropriate the advantages of this idea for the annual meeting of that year. An identification badge of this type is of the greatest convenience on excursions and in passing members of an excursion party on public conveyances. Reproductions and derivatives of the French emblem were used for a year or two thereafter and there may still be found cuff buttons in use which were the convention badges of this period. The lapel button was restricted to members, and guests had a pin with the initials M. E. worked into a scroll, which they were permitted to wear as a designating emblem.

The next development from the lapel button badge and the printed alphabetical list of names was the plan

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of numbering the lines of the convention register or of the registration card so that each man registered a number as well as his name. He wore this number on a small celluloid shield attached to his lapel button. Hence by consulting the printed list any numbered man could be identified by name by those who remembered a face but could not at once recall the name. The approach of the members to each other was assured and the awkwardness of shyness and self-distrust removed.

The next and final step was taken during the administration of Mr. James Mapes Dodge and at his suggestion and initiative. This was to substitute for the numbered button in the lapel a fixture, into which could be slipped the name of the member printed in sufficiently heavy faced type to be usefully legible. This plan is the highest development of the policy and principle of self-introduction and identification at a meeting. The influence of this quick identification by name at conventions has been so significant and valuable in promoting the social success of meetings that it can scarcely be overestimated.

ENTERTAINMENT OF THE SOCIETY AT MEETINGS

The problem of large meetings of the Society for the reading of papers and other purposes has presented some difficulties from the very start and certain principles have had to be followed in legislating for them.

The Annual Meeting of an incorporated society is signalized under the Civil Law in most of the States by the election of its officers for the year and the report of the members with respect to the finances of the Society and its work for the year. It must be held either really or nominally within the borders of the state which has created the corporation. Hence The American Society of Mechanical Engineers must hold its Annual Meeting in the State of New York and since it has had an office headquarters in New York City, that city has been the convention city for the Annual Meeting.

The other meeting is usually called the Semi-Annual

Meeting and is held about six months after the Annual Meeting. It is usually convened in some city or place where adequate hotel accommodations can be found for a large number, and also with regard to points of engineering or other interest and so that those who find it difficult to attend the New York meeting by reason of the cost of the journey, the long absence from duty or for other reasons, can attend the Spring Meeting with less sacrifice of time and of traveling expense. This has resulted for many years in a general policy of having the Spring or Semi-Annual Meeting at some point West of that where the geographical center of gravity of the area covered by the membership might lie in any year. This point lies in Western Pennsylvania or Eastern Ohio.

This policy has not been rigorously followed but is departed from for any reasons of weight, such as to bring a Spring Meeting into New England once in a series of years and to enable the Society to visit Washington or a city in Canada during a season of attractive weather. The problem of comfortably accommodating large numbers in the hotels of a locality must influence the selection of convention cities and render unavailable a group of places otherwise most desirable.

Hotel facilities are most easily found at summer resorts and the experiment has been tried at rare intervals of going to such a meeting place where there would be no distractions of an engineering sort from the sessions for the reading of papers and where full opportunity could be given for social intercourse. The objections to this plan have been that the absence of engineering points of interests has made earnest, busy men feel that they did not win adequate return for the time spent away from office and business. There are others to whom the scenic attractions of ocean or mountain do not make an appeal. In such meetings the social side will inevitably dominate and there are those to whom this is an objection. Notable exceptions, of course, are certain historic cities or those such as Washington, D. C.,

where the associations and general interest are paramount and the engineering interest of less importance.

The first method of selecting the place of meeting was the acceptance of an invitation from a group of members resident in a city or area, asking the Society or the Council to choose their center as a meeting place. Such an invitation has usually behind it a double motive. On the part of members it is the desire to show personal and professional hospitality to friends and colleagues. The officials of the city and its Board of Trade or Chamber of Commerce who concurred in the invitation recognize that acquaintance and familiarity with the capacities and products of the city will be of commercial and industrial advantage to it. This advantage will be both subjective within the city and objective outside of it. Some cities have organized committees which seek to bring conventions to it for the advantages of the hotels, railways and general reputation and publicity. The Council in a few cases has itself taken the initiative when in its opinion the interests of local industry or the reputation of the Society would be helped by a meeting in a locality and perhaps in one where there were few or no resident members. Such meetings have been those held in certain places of the South, at Niagara Falls, and elsewhere.

The objection to the first policy has been the existence of a real or fancied obligation that such an invitation given to the Society imposes on the local membership or the local industries an unavoidable expenditure of money for excursions or other entertainment of various kinds. These difficulties grew with the increasing size of the Society and the number of members attending its conventions. There finally resulted a second and now existing policy that the Council should appoint the place of meeting independent of any invitation from members or from any convention or promotion bureau in the city itself. The convenience and timeliness or advisability of such appointment should always be ascertained beforehand. The initiative, however, lies with the

Society itself and should impose no burden (deemed unavoidable because self-assumed) as respects the expense attaching to carrying out the program of the meetings. This policy is the one now in force and has so much to commend it that it will be changed only for reasons which do not now appear cogent.

The activities attaching to a meeting of the Society fall into two separate groups. The one is the professional work of the program, which includes a hall for the convention and the reading and discussion of papers, the stenographers to report the meetings, the incidental printing and expense for registration office and the Secretary's official obligations. The other group contains those features, which may be classed as entertainment or hospitality and include the invitation to works, the transportation to these or on excursions to other objective points, the lunches or collations to be served on excursions or at any receptions or similar functions, and music if it is to be supplied at any time.

It is outside the arena of discussion that the Society itself should meet the expenditures in the first group from its funds, so as to cover all matters which have to do with material which goes into the Transactions, such as papers, discussions, minutes and rental. All members of the Society are benefited by these features of a meeting whether they are present in the body or not, and they are a proper charge upon dues and other Society income. It is not so clear how the expenses shall be met which are for the pleasure only of those who are present at the meeting in person and those who are guests of members or of the Society or its hosts, and may be assembled for purposes not directly in line with the objects for which the Society exists.

Two possible methods seem to be open, and a third which combines them. The first is for the members resident in the city where the meeting is to be held to contribute or to solicit from industries interested or to secure from both sources what the ambition of the committee on arrangements decides to be necessary. The

standard is set by entertainments in other cities, or by the civic and social pride of the leading men. The visitors are then completely in the position of guests of the resident members and industries and are put in the position of being under an obligation which they can only return when their own city becomes the host; and where members live in places where no convention will ever be assigned, such a debt of obligation can never be canceled but becomes cumulative as the years go by. The other extreme, or alternative plan, is to make each member attending a convention pay for his share of the expenses of entertaining him and any guests whom he may invite, and to deny to the members who are hosts of the visiting members the privilege of doing anything in the way of local courtesies which cost money. The local committee may secure transportation at reduced rates in the city, and organize excursions to points of engineering interest; but they must not pay for such facilities, nor solicit the gift of them from transportation companies, nor ask for free special trains or boats for excursions. The members of the Society and their guests are to pay their own way and by purchased tickets of admission are to bear the expenses of luncheons, collations, music and decorations and similar outgo.

This plan avoids the embarrassments of obligation to either party, and the dangers from an extravagant standard for the entertainment of visitors, possible in a large city with many resident members, but impossible in the smaller city or where the resident membership is limited. The objections to this latter plan are that it commercializes the relations of host and guest in a way disagreeable to many. It permits the member of moderate means to exclude himself from certain features of the convention, and so draws a line of class distinction which should be absent in such a coming-together of engineers. It frustrates and antagonizes the instinct of generous-minded hosts, or of those who would feel it a privilege and opportunity to bear a share in entertaining friends and colleagues who have come to their city on

the initiative of the Society and its organization of a meeting there. It has the further and practical difficulty of compelling the local committee of arrangements to inform itself in advance as to how many persons propose to buy the necessary tickets of privilege for each element of the entertainment program, or else to arrange to guarantee any deficit or gap between the numbers anticipated and the numbers of cash purchasers who may or may not elect to participate.

The difficulties attaching to both plans will be most acute in the case of an Annual Meeting where the necessity for entertainment and social opportunity recurs from year to year, or with considerable frequency. This makes the first plan burdensome, and points to the workability of the second plan in this case, in spite of the objections to it. There are grave difficulties attaching to the idea of assessing every member in a territory within which a meeting is to be held, with the purpose that the Society shall collect it through its channels and subject to the penalty attaching to non-payment of dues to the organization. This further makes classes of membership and claims of privilege or their absence, which should not exist. It remains true that a member who attends a meeting at a distance from home spends much more than he will be likely to subscribe if the meeting was held at his home city. This constitutes an argument for the first plan; but it does not apply in the case of those who would not attend the meeting in any case or wherever it was held. Such might properly object to the assessment plan for the expenses of a meeting.

In the light of present wisdom, a combination of these alternatives seems to offer the least objections. Let each member attending a meeting pay his transportation or excursion expenses for himself and his guests; and if a banquet or a costly reception is an approved feature, require cards of admission which shall similarly be paid for. This policy reduces the number of "camp-followers" and simplifies the problem which they present to the local committee. On the other hand, it permits the

local members to find an outlet for their hospitality by providing collations or luncheons on the excursions at which the visitors shall be the guests of the hosts without imposing the requirement of a purchased ticket.

A special problem in this class, but a much simpler one is presented as respects expenditure in connection with monthly or other meetings of local groups of members or meetings of professional sections held at times other than those of the stated Annual or Semi-Annual Meetings. The Society should plainly provide in its budget for the professional expenses of such meetings, such as rentals, stenographer, reports and minutes and some printing and postage. Other expenditures of purely individual or social significance to the members concerned should as obviously be provided for by subscription among those who benefit by it. There are here no outsiders in any number to be considered or provided for. While such gatherings are Society meetings, they are not meetings of the Society in the formal and legislative sense.

Under the foregoing general principles, for many years, a Society convention provided for five professional sessions in three days. Under the pressure of the wider interests and greater number of papers offered in later years, synchronous meetings of sections of groups have been provided whereby the number of sessions could be increased but not the over-all length of the convention in days. The objection to this is that members interested in topics in contemporaneous discussion must choose which of the sessions they will attend in person and there are many places where it is difficult to find separate rooms for sessions at the same hours. It seems, however, to be the direction of normal growth and development. There still must survive in many places the formality of an address of welcome from a civic personage at an opening session but little by little this is sure to disappear. It is made of the least futility by convening such sessions on a Tuesday evening so that Society business may begin with a rush on Wednesday

morning and can be ended on Friday at noon. The Tuesday evening after the preliminary numbers can also be utilized for a reunion of a simple sort, intended to renew old acquaintance, and enable the local membership and their ladies to meet the visitors and be ready for the later features of the program. Then will follow professional sessions on Wednesday morning and evening, and on Thursday and Friday mornings. Wednesday and Thursday afternoons are then available for visits to engineering plants or other points of interest, and Thursday evening may be utilized for a distinctively social function if it is so desired. Thursday evening may supply time for a professional session instead of Friday morning, leaving Friday free for an all-day excursion or visit. Experience shows that neither executive officers nor members find three separate sessions a day to be productive of efficiency. Tired members and jaded officers do not make a successful session.

THE BANQUET AT CONVENTIONS

The Society followed at first and for some years the English practice of giving to the social feature of the meeting, usually on Thursday evening, the form of a subscription banquet. Such formal functions were features of the meetings at

Hartford	May	1881
Altoona	August	1881
New York	November	1882
Cleveland	May	1883
Pittsburgh	May	1884
New York	November	1885
Chicago	May	1887
New York	December	1912
New York	December	1913
New York	December	1914

Mr. Alex. L. Holley, founder of the Society, was a delightful after-dinner speaker who had made the reunions of the Institute of Mining Engineers delightful memories to those privileged to enjoy them. It was at the Hartford dinner in 1881 that he made his memorable address

Coleman Sellers

PAST-PRESIDENT

OF

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

on The Inadequate Union of Science and Art, full of epigram and sound sense. It was in this speech that he spoke of the Corliss locomotive, which as a recent college graduate he ran between Providence and Stonington, Conn. Its complicated valve gear was full of lock nuts and springs. It had a fondness for coming into the terminal with one side out of action and a violent preference for going dead over an open trestle in winter with icy water below. Dr. James C. Bayles, also a delightful memory of the Mining Engineers' banquets, seconded Mr. Holley in making the after-dinner function a delight. After Mr. Holley's death and Dr. Bayles's departure from the editorial chair, his withdrawal from the Society and later his death, the burden and usually the failure to provide attractive after-dinner speakers turned the attention of the Secretary and the program makers to the disadvantages of the banquet as a social feature. In the list of such disadvantages may be included:

(*a*) It will necessarily be a subscription feature. Those who feel the necessity for economizing in their expenditure, or whose expenses are being paid for the sake of the professional return at the meeting, will stay away. The Society is at once stratified and divided into classes, one of which gets more from a meeting than the other.

(*b*) A banquet is a success when one is well-seated; a dismal failure if one is not. If seated among friends already made, there is no progress effected in acquaintance. The new and unacquainted member makes little headway for no one seeks him for a neighbor.

(*c*) The hard and fast formality of the seating at table does not favor a broadening of acquaintance and its growth. The banquet therefore fails of the larger and more valuable part of its object.

(*d*) Speakers fail more often than they succeed.

(*e*) The banquet is a great deal of trouble, disproportionate to the return in advantage.

(*f*) It is safest and cheapest to serve it without wine; tobacco smoking in the presence of the ladies of the party

is bad form and will be refrained from; and yet both of these standards will be objected to by some. If they protest to the extreme of staying away from the function, the first objection is reinforced.

For these reasons the banquet was replaced by the reception. It was made a function whereby every member and guest was formally conducted and introduced to the President of the Society and to its Secretary. In addition at the Annual Meeting the President-elect and the Honorary Secretary with their ladies are added to the reception line and, at the Semi-Annual Meetings, the Chairman of the Local Committee and the presiding Vice-President where there are contemporaneous sessions held, are also placed in line. After the formalities of introduction and handshaking are over, music, dancing and a supper follow. The freedom of intercourse, the wide participation of all members, the invitation feature for the local membership who are entertaining the Society, and its effectiveness for its purpose are emphatically valid arguments in its favor. It is particularly advantageous to the young member of the Society and to members and ladies who have not attended many meetings hitherto. The young member will always be a unit in the class of listeners at a banquet, rather than in the participant class.

VIVA VOCE LEGISLATION AT MEETINGS

Another principle of the philosophy of administration in a national society of engineers which became visible in time, was the futility of getting the Society in session at conventions to pass resolutions asking some other body to take some action. This was notably apparent when the proposition was made to urge the United States Congress or one of its committees to take some admirable action in relation to engineering matters, or the prosecution of governmental research. This policy appeared first in regard to the establishment, or revivifying, of a commission to test the materials of construction; and again to relieve the unendurable conges-

tion in the United States Patent Office; in opposition to a compulsory introduction of the metric system of measures; and again in connection with what was then called the Naval Personel Bill, to secure the same standing and relative rank for officers in the staff and the line; and in many other similar opportunities. Able and enthusiastic advocates have offered well-worded resolutions on the floor of the sessions, for the Society to pass with a view to putting itself on record, and for such action to be transmitted to the arena of debate in Congress to strengthen the arguments on one side or the other. The best critics and of the soundest judgment have held that votes and resolutions of this class do not count for much; and are therefore of disadvantage to the Society in a lowering of its dignity. Persons acquainted with the real meaning of such a "town meeting" vote know that it is not representative of the Society as a whole, but of only a relatively small number; furthermore, a skilfully presented plea in such a meeting can win an affirmative vote from the unthinking and easily led, no matter how ill-advised the content of the resolution. It would be much better to have the matter in question referred to some deliberative body, such as the Council, to consider it in all its aspects, and then to formulate such action as such careful consideration would suggest. In matters relating to national legislation, the wise precedent was early established that the form which the Society influence should take might better be the sending of personal letters from the prominent men of the Society to the legislators whom they knew personally, covering their advocacy of the proposed policy or bill. Such personal letters were of more value than bundles of resolutions, which any legislator knows can be secured with little effort and consequently have corresponding lack of weight.

The same or a parallel line of reasoning and procedure has prevailed in the handling of Society questions where deliberate consideration as to the wisdom of taking action has been required. The forum of the open

meeting is not the best place to form wise opinions, and particularly under the pressure of a powerful personality or a group of them pressing their advocacy of their views of the question. Even so intermural a question as the formation of a professional committee to examine a subject and report, and particularly the constitution of such a committee in order that all interests may be fairly representative, is a matter which a wise and sound precedent refers from the Society meeting to the Council with power.

To meet and avoid some of the difficulties surrounding a *viva voce* vote on important questions, the Society has followed the precedent of the letter ballot in some cases. This was assumed in the earlier forms of the Constitution of the Society and was specifically incorporated into the provisions of the revision of 1904. Every member can then impress and express his views, and not only those present at a particular place. Many on the other hand must be imperfectly informed as to the considerations and arguments to be advanced when the question is a controversial one; votes may be influenced by the parties willing to spend the effort to electioneer for votes and who always present only one side of the case. Some members will not vote in any case where they do not feel adequately informed.

The election of officers is always by letter ballot to give every member the feeling that he has a voice in the formulating of the Society's policy through the persons whom he votes into office. Amendments to the Constitution are also always effected by letter ballot, although the early Constitution gave to the majority present at an Annual Meeting the privilege and duty of the declarative act to amend. The only two questions outside of this group which have been submitted to letter-ballot have had to do with the attitude of the Society towards a proposed compulsory introduction, either into governmental departments or upon the nation as a whole, of the metric units for measurement of lengths, which would make the use and retention of gages and standards

based on the English inch or the standard illegal in industry. The first action was:

Resolved, That the Society deprecate any legislation tending to make obligatory the introduction of the metric system of measurement into our industrial establishments; also that the Secretary be instructed to communicate the sentiment of this resolution to any one concerned in procuring such legislation; and further that a copy of this resolution be sent to the Anti-Metric Society of Cleveland, Ohio.[1]

The vote on this resolution was 135, of which 111 voted "Aye." The membership was then about 250.[2]

The second letter-ballot in this class was ordered in 1902;[3] the vote as classified by the tellers who counted it showed: In favor of the adoption of the Metric System as the only legal standard in the U. S., 103 (being 20%); against adoption of the Metric System as the only legal standard in the U. S., 363 (being 80%); in favor of legislation which would promote adoption of the Metric System, 153 (being 33%); against such legislation, 311 (being 66%); the substitution of the Metric System for the English would be detrimental to business, 243 (being 58%); such substitution not detrimental, 145 (being 42%); such substitution would be advantageous, 89.

The membership of the Society was over 2,500 at this time, and of this number only 514 voted, or a few over 20 per cent. In both these cases the ballot was rather an expression of opinion than a legislating vote.

STANDARDS CREATED BY COMMITTEES OF THE SOCIETY

It was the expressed wish of those who founded the Society that when it came to its own, it should be able to speak with authority on professional matters, and not as the scribes identified with some personal interest. The representatives of all branches would have a horizon or judgment much broader than those of any one or two persons, however highly specialized in their own line. From this grew the idea of having the Society create

[1] Trans., vol. 2, p. 9, 1881.
[2] Ibid, p. 4.
[3] Trans., vol. 24, p. 76, 1902.

standards of procedure, of method or design, which after scrutiny and possible attack in the Society should then be accepted as having value as recommendations. After such scrutiny the standard would have an acceptability and a value much greater than that of any individual recommendation.

The activities of the Society in this connection are listed in Chapter XVI, but a problem and a philosophy respecting such standards may properly receive attention here. The usual procedure to secure consideration of a proposed standard has been for the person interested in its creation to contribute a paper. This paper, or the discussion of it, would commonly embody a resolution referring to the Council the expediency of appointing a committee to consider and report their recommendations. The committee would then be created if the Council acted favorably on the resolution of reference, and it would select competent persons to give weight and scope to its report.

What should the Society do with such report of the committee if it embodied a recommendation of one or more standards?

Two courses would appear to be open. One would be to receive the report if acceptable and by vote of the meeting or by letter ballot of the Society to adopt the recommendations of the committee and make their action that of the Society as a whole. This is followed by certain societies. The other plan is to receive the report, order it upon the record of the meeting and print it in the Transactions, but to refrain from any action which would be construed or known as an adoption of the report and its recommendations. This action carries with it a weight and recommendation but no further obligation.

The Society adopted the latter policy after a most valuable debate in 1885, on the presentation of the first committee report recommending a standard method for the testing of steam boilers. The reasons for this decision never to adopt a report as official action have included:

(*a*) No report or standard is properly labeled as adopted by a national society when such action is taken by a relatively small minority of the entire membership assembled at a convention, and voting *viva voce* from its floor.

(*b*) Such vote to adopt must therefore be a letter ballot of the entire body to be properly representative of the Society as a whole.

(*c*) Relatively few of such voters of a letter ballot are qualified by experience on the subject matter to vote intelligently in the affirmative, or to antagonize its positions by a negative vote. By far the greater number voting will do so because the committee reporting has their confidence; the committee has worked hard and the report represents its matured judgment. Such a letter ballot, therefore, has not so much greater real weight than the report of the qualified committee, or the affirmative vote of the open meeting.

(*d*) Should the adopted standard be an article of manufacture by any persons or corporation, the Society is taken into a sort of implied business partnership in the production and sales of such an adopted standard. No business move could be more shrewd than to succeed in inducing the Society to favor such vested interests in production; where low moral standards prevail it is conceivable that an effort might be made to buy the adoption of such a standard.

(*e*) The procedure to modify or replace a standard as knowledge and industrial conditions advance should require a letter ballot of the entire voting membership if such a standard has been adopted by the Society. It might easily be made difficult to secure the necessary majority of the entire Society to favor such reconsideration. The Society therefore stands committed to something outworn, and hence to its prejudice and disadvantage.

(*f*) Controversies between interests involved in the adoption or the defeat or the reconsideration of standards will bring into the Society the atmosphere of the

market-place. The Society is a professional body, not a commercial one, and should keep to its own high plane of thinking and activity.

(*g*) It is conceivable that the Society might be made a party in a suit for pecuniary damage done to some one by its action in adopting a standard which entailed expense to one who was making a differing standard, or which invaded his business prosperity. The Society was without any pecuniary interest in the premises whatever, but being an incorporated body it is liable to suit, and to a judgment against it if such suit was won on the basis of an official action taken.

INSIGNIA OF THE SOCIETY, SEAL, DIPLOMA, BADGE, MEMBERSHIP CARD

The Society was incorporated under the laws of the State of New York on December 1, 1881. It became necessary to design a seal to be affixed to official instruments. The accepted design was that of the lever of Archimedes which was capable of lifting the world should an adequate fulcrum be found. The suggestion was that the union of men of science could be the place on which to rest the influence which the Society sought to wield. The globe rests on the shorter arm of the lever. When later a separate library association was thought advisable (Chapter XV), the same line of thought placed a lifting jack under the world globe and the orderly pile of books was the resting place for the base of the jack. This design of the world and the lever was formed into an intaglio die, by which paper could be embossed, and it was thus affixed to certificates of membership and cards of introduction. It has also been used for many years on envelopes, mail wrappers and the Society's publications to give an individuality to the matter emanating from Society headquarters.

THE DIPLOMA OR CERTIFICATE OF MEMBERSHIP

The Council authorized or directed in the first year of the Society's existence that the member on election should

be entitled to a certificate or diploma signed by the President and the Secretary and with the Society's seal affixed which would certify to the fact of his election and membership in the proper grade. The philosophy of the certificate or diploma is two-fold. If framed and hung on the wall of an engineer's office, it is a publicity document attesting without speech to the functions of this Society, tending to excite interest in an organization of such exalted aim and possibly a desire on the part of the beholder to join also. On the other hand, it is a silent witness for the holder of such a diploma and testimony that five other engineers knew him well and favorably enough to allow the use of their names in his candidacy before the Society and when his name was submitted to the voting authorities of the Society, there was nothing said or known to militate against his election. The certificate and the membership which it evidences are a sort of "cachet" as the holder's engineering and other qualifications.

The certificate is printed from a plate or stone in ornate style 20 by 24 inches in size, with the name of the member engrossed thereon and his grade of membership; it is signed by the President in office at the time of election, sealed with the official seal, and countersigned and attested by the Secretary's signature. Its wording is as follows:

THE

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

INCORPORATED 1881

This is to Certify that

____

is a ____________________ of

The American Society of Mechanical Engineers, an organization for promoting acquisition of that Knowledge which

is necessary to the Mechanical Engineer to enable him most effectively to adapt the achievements of Science and Art to the use of mankind.

Witness our hands and Seal at New York this

———— day of ———— 19

———— President ———— Secretary

MEMBERSHIP CARD

The membership certificate is not portable. It was early thought that a useful purpose would be served if the Society was to furnish to its elected members a card of introduction bearing the signature of the Secretary as a means of authenticating him and to carry also the signature of the holder so as not to be transferable to unauthorized hands. After the card was signed by the member it was returned to the Society office and the paper embossed by the die seal as an additional protection and authentication. It was, of course, an identification card in case of emergency and could be used to accompany the member's personal card when he sought to introduce himself.

A second form designed in 1902 bore the embossed seal of the Society in red upon a card of smaller size but did not authenticate the member's signature. The third and recent form carried on the reverse side the names of the societies and engineering bodies with which the Society is in correspondence relations entitling the member to the courtesies and privileges of the house, meetings and library of the related organizations to which the Society of Mechanical Engineers extends reciprocal favors.

THE MEMBER'S GOLD BADGE

The advantage of a personal emblem to be worn as a piece of jewelry by the members was also realized in the first year of the Society history. It was made in the form of a watch charm or a pin to be worn on the waistcoat or neck scarf and to carry to the eye the fact of membership in the Society without the act of self-

introduction. The need of such an emblem is manifest at meetings or conventions where non-members may also be accidentally present in assemblies; or in travel or sojourn among strange persons as an opening of introduction between those who are as yet strangers, the badge has an obvious and real value. Its design is that of conventionalized four leaf clover or emblem of good fortune in gold, enamelled in dark blue and with an initial of the Society name on each leaf. The Society has always reserved the right to order these emblems manufactured, to safeguard the design and the right to wear it, as well as to maintain the quality of the workmanship. A few enthusiastic members have jewelled their badge.

It may be of interest to speak of the origin of this badge. A Mr. Robert Sneider, an engraver and stationer on Broadway, New York, had been employed to prepare an ornamental die for use in connection with printed matter related to the Hartford meeting in the Spring of 1881. The four leaf clover symbol was the submitted design used on the programs of that meeting. Its neatness and appropriateness appealed to the Society to such an extent that the design was selected without material change as the badge of the Society. It was made for many years by a Mr. Demarest on Broadway and later transferred to the shops of Bailey, Banks and Biddle of Philadelphia.

The earlier practice was to change the blue enamel of the member's badge for a red background when the member became an officer by election. This was discontinued after ten years or so, because the blue was the handsomer color, the exchange of badges a troublesome detail and in the lapse of years the significance of the fact of office grew less as compared with the broad significance of attested membership. There was also a period in which the badge of Junior membership was a special design of a round gold disk with the four initials of the Society's name in a monogram or cipher of script letters. This was discontinued later for the same reason,

that the fact of significance was that of membership and not of the grade of such membership. It was of advantage that the form should become of universal recognition and variants from one standard tended only to confusion. The single design is therefore now in use, the red enamel color being reserved for Juniors.

It is obviously proper that when a membership terminates by death or resignation or otherwise, that the pin, badge and introduction card should be returned to the Society as an evidence of good faith and the certificate of membership either destroyed or kept from going into improper hands.

The Society is always ready to buy back the gold pin.

ACTION OF THE SOCIETY ON THE DEATH OF A MEMBER

The death of a member of the Society in its early and formative days seemed necessarily like the reaching of a "shining mark" by the dread arrow, because the first group of members was constituted largely of men who had attained to eminence and who were for this reason invited to become charter members. There was, therefore, usually good reason for the Society or its Council to take the usual action of deliberative bodies and pass resolutions for record and for transmittal to those bereaved. It soon became manifest, however, that with the growth of the Society this procedure would become purely perfunctory from a lack of acquaintance with facts of experience and with personality; and it would not do to take memorial action for one and not for another. All deceased members must be honored alike, and yet on the other hand the meetings of the Society and of the Council were filled with business of importance, and the time of busy engineers should not be too seriously invaded by turning such assemblies into reunions of mourners. The difficulty must also be avoided of allowing the voice of surviving friendship to be heard at length as respects a member of moderate professional reputation or one limited in scope, while the accidental absence of such a friend would permit the death of an

eminent and distinguished engineer to pass unnoticed. This difficulty is as old as the Augustan age, in which Virgil sang his regret for some hero because "he lacked a consecrated minstrel" to keep his fame alive in verse and song.

To meet and neutralize these objections the practice was developed in which the Secretary reports for record in the minutes of the Council the losses by death since its last meeting and similarly records the names in the proceedings of the Society at its conventions. The Council orders the preparation of a memorial notice by the Society and its publication in The Journal, or the Transactions, or both. The Secretary is editorially responsible for the contents of such memorial, in order that it may confine itself mainly to matters of professional achievement, and may avoid eulogy or panegyric as respects the personal or social qualities; but he is expected to get all possible help from a member's proposers, or business associates or from the family. Exception is made, however, to this general rule in the case of Honorary Members and Past-Presidents of the Society. These have been placed in positions of honor and distinction in the Society by formal vote of its members electing them thereto, and it is proper that their death and their achievements should be more distinctively recognized. Their memorials are monographs prepared by some qualified person and are illustrated with portraits. It must still remain in days of concerted achievement of many minds in one undertaking, that the history of a single personality will often be the professional history of scientific progress in any age or in any line. These memorial notices are the place to record such personal connection with acts and decisions now matters of general information, and will be found of greatest value for these reasons. They should be continuously maintained in the life of the Society.

CHAPTER V

Standing Committees of the Society

It has already been stated that in the first fourteen years of the Society's history the Secretary was the prime minister as well as the executive of the Council. The initiative and most of the details lay in his hands and his ability and energy conditioned to a great degree the extent and variety of the Society's work. It was obvious, however, that to relieve the Secretary of the burdens of responsibility there ought to be administrative committees to oversee his work and assume some responsibility for it. The two committees appointed to this end were the Finance and the Publication Committees and, in the earlier and simpler days, these were enough.

The Finance Committee had the burden of making expenditure correspond to income. It prepared the budget for the year on the basis of expected income, and the Treasurer demanded the signature of the Chairman of the Finance Committee on every bill before he considered himself authorized to pay it. The Council approved the budget of the Finance Committee and the Secretary incurred expenses under the appropriations so approved. There was never any surplus in income over expenditures calling for a deliberation of the Finance Committee as to its disposal. The Treasurer drew a check for each individual bill. The Secretary advanced the petty cash necessary for office operations out of his own funds and presented a reimbursing voucher at proper intervals. The bookkeeping was of the simplest elementary type.

The Publication Committee was responsible for the approval of the papers which had been secured by the

Secretary. It was responsible for the quality of that which appeared in the Transactions and everything which it accepted as of adequate quality was read at the meetings and published in the volume of Transactions. The Secretary was the editor and the committee was only called in on editorial questions when for any reason it was desirable that he should be protected by an impersonal action from the wrath of contributors. Circulars were issued by the Secretary at intervals to ask for topics on which papers would be found of interest and any suggestion in a debate which revealed an available storage house of information was at once seized on in correspondence.

In 1885 the first further development of standing committees to be created was the Library Committee, but for many years after its formation there were no funds for it to spend and its activities were limited to a general oversight of the problem of extending the list of exchanges. It took a new lease of life and activity when the Society moved in 1889 to the new building of the Mott Memorial Library and again in 1890 into a building with an available library area. The Library Committee, however, was soon merged as respects its activity, into the work of the Mechanical Engineers' Library Association Board and the latter discharged the duties of a Society Library Committee, until the move was made to the great Engineering Societies Building in 1906-1907.

The fourth standing committee became necessary when the Society moved in 1890 to its building at 12 West Thirty-First Street. The House Committee was then created to plan the expenditure and to carry the responsibility for the increased activities when the Society occupied its own house. This House Committee was in charge of any reunions of members and the care and supervision over such decorative and historic material as the possession of a Society House made it possible to receive and exhibit. All these committees were newly appointed by the President on assuming office, but

ordinarily an effective and faithful man would be retained from year to year. Mr. Stephen W. Baldwin, for example, was Chairman of the Finance Committee of the Society for eighteen years. Major Wm. H. Wiley was Chairman of the Publication Committee for nearly as many years.

The re-organization of internal activities of the Society which took place in 1904 was the result of the change of policy which was made at that time whereby the interest and energy of members of the Society could be enlisted in the conduct of its affairs by making them members of Standing Committees, which should be truly legislative and deliberative bodies under the supervising authority of the Council. This multiplied the agencies for Society work centering in the Secretary's office and the powers and energies formerly at work there. The new policies were built upon the foundation of the old, or greatly extended as a growing importance of their work made necessary. A new committee was created to discharge some of the old activities of the Publication Committee and to take on many functions which the Secretary had previously exercised under the general authority of his office. The existing four committees were retained with extended activities.

The name Committee on Meetings was assigned to the new committee. Its duties were to obtain the papers for presentation at meetings and to pass upon their acceptability. The duty of deciding after presentation and discussion at the meetings upon what papers and discussion should be worthy of permanent record in the Transactions of the Society was put in the hands of the Publication Committee. The Committee on Meetings was also made the responsible agency with respect to the program of the meetings, not only as regards the papers and their assignment of place and time but also of details as to visits, excursions and side trips. All matters which were germane to the function of a Standing Committee were to be handled in the committee before they came up to the Council for consideration, if the latter took place at all.

Geo. H. Babcock

PRESIDENT 1887

OF

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

he committee on Meetings soon found that it was
ıost heavily burdened Standing Committee of them
The volume of papers increased, and presently addi-
l meetings of local groups of members and of sec-
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sh, was designed to secure a sort of bi-cameral con-
ation. The practical working of the system brought
; confusion and did not save printing expenses, be-
under the system of advance publication and dis-
tion of papers, the real expense connected with any
r was ordered by the Committee on Meetings, and
e Publication Committee decided adversely on the
cation for permanent record, the cost of composi-
of the paper for the meeting was lost. Later, legisla-
by amendment to By-Laws made the Publication
nittee responsible for all printing contracts as an
nistrative philosophy and the Committee on Meet-
became more a committee on Program. The Publica-
Committee took over all decisions as to the appear-
of papers in The Journal of the Society and as-
d the responsibility for the printing and issuing of
ociety's Year Book and all pamphlets.

hen the Society moved to the Engineering Societies
ling in 1906-1907, the Mechanical Engineers Library
ciation was discontinued and with that step the op-
ınity occurred for service by the Library Commit-
f the Society. There were not enough funds avail-
for the extension of the Library for the first few
; by reason of the intense and insistent demand for
nditure in other directions on the entry into the new
. In 1908 the first movement towards federating

the libraries of the Mechanical, Electrical and Mining Engineers took place, and in 1914 the Trustees of the United Engineering Society created a Library Board for the administrative and other activities of the combined library and the members of the Library Committee of the Society became its representatives on the Library Board.

The Constitution of 1904 gave legal existence to the committee which had previously been a committee of the Council to consider applications for membership in the Society and report their recommendations to the Council. During periods of considerable activity and rapid increase in the Society's membership, this Committee has also been one which made great demands upon those who served upon it. They had under their control the broad question of the quality of members elected to the Society and exercised great care in the discharge of their functions.

By later legislation and to meet what appeared to be wise demands, a provision was made in the Constitution and By-Laws for the appointment of a Research Committee, a Public Relations Committee, a Committee on Constitution and By-Laws and a Standardization Committee. The Research Committee is designed to be a general supervising body or clearing house with respect to investigations by experiment or otherwise. It is intended to correspond and collaborate with committees of a kindred spirit in other societies, in order to prevent the unnecessary duplication of work. It is supposed to keep in touch with researches conducted in other countries and to arrange that fields of research in which there are few laborers shall be opened for the advancement of knowledge in those directions. It is not intended to be a committee for the conduct of research in the laboratory or elsewhere, but to coöperate and direct such research by experts competent to undertake them. It is the wish and expectation that the Committee on Research shall maintain a system of announcements of the results of research in The Journal or Transactions, and gifts or be-

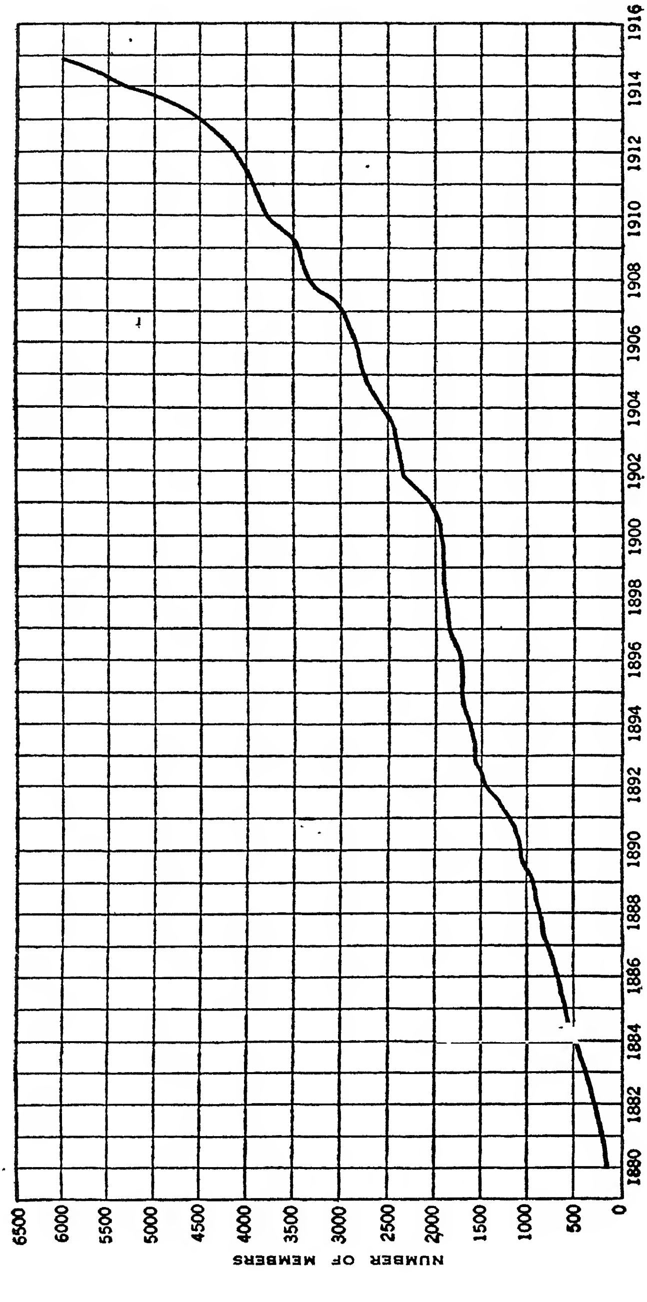
quests to this end would be administered under the committee control.

The Public Relations Committee is intended to be the channel whereby a knowledge of engineering and technical questions can be made available and serviceable to the general public. A modern civilization comes into such intimate contact with the activities of the engineer that the duty of the engineer in securing effective coördination between the engineer and the public seems an important feature of Society activity.

The Committee on Constitution and By-Laws is a legalization and a recognition of a committee which had been in existence since 1904 to consider and report on proposed amendments, which might originate in the Society at large or which might grow up in the needs and the development of the Society's work. Its prime requirement is familiarity with different parts of the existing legislation so that confusion and contradiction shall be avoided, and so that an adequate consideration of new proposals may be secured before they come up for action.

The Committee on Standardization is intended to do for the general trend towards the creation of individual standards what the Research Committee seeks to do for investigation and research. It is to consider what standards are called for or will be improvements over existing conditions and to prevent confusion and contradiction in standards originating from various sources. It is not supposed to create standards by its own action but rather to be the channel through which proposed standards shall be considered in their relations to others.

A diagram will be of interest showing the normal growth of the Society in numbers and the accelerated rate since a permanent Committee on Increase of Membership began its actice service.



GROWTH OF THE SOCIETY IN MEMBERSHIP, 1880 TO 1914

CHAPTER VI

Presidents of the Society. Some Significant Administrations

[t has been noted in a previous chapter that there is ally some individual or personality behind an event ın achievement, so that history is often written in ns of a reign or dynasty. So in a Society, many sig- ;ant steps may be attached to the service of an office- rer; and the Society history be viewed in the light of individuals who have served it.

Γhe offices in the Society have been the Presidency, Vice-Presidencies, and the positions of Manager, asurer and Secretary. The officers form the Council he Society, who are its Board of Directors, trustees ts property and responsible for its policy and con- t. The officers are elected by vote of the membership nomination by a Nominating Committee of the So- y, with the exception of the Secretary, who is elected he Council, and for reasons discussed elsewhere. The surviving Past-Presidents who have been most re- :ly in office are voting members of the Council, under olicy which assumes these men to be most active and iliar and interested in Society affairs, and enabled by familiarity to be effective also in carrying forward cies which they may have initiated. At one time all Past-Presidents were members of Council; but as list grew with the years this plan was thought to be ise as offering a danger lest elected officers in any r be overshadowed numerically by the numbers and ght of persons not in office, and a danger of a perpetu- l ring-rule be threatened.

Γhe President in the early years was eligible to an ıediate reëlection, but later he was also put in the

class of the other officers who are not eligible to a second term on the expiration of their first. The early policy recognized the fact that a President who came to his office unfamiliar with its duties would be much more efficient and serviceable in his second year than he was for his first. The change was due to the increasing amount of available presidential material in the Society, and the wisdom of giving the honor and privilege of office to a wide range of the membership.

The following list shows the names of those whom the Society nominated and elected as Presidents:

Alexander L. Holley, Chairman of the Meeting for Organization of The American Society of Mechanical Engineers........ ....Died January 29, 1882

PRESIDENTS

1	R. H. Thurston	1880-1882	Died October 25, 1903
2	E. D. Leavitt	1883	Cambridge, Mass.
3	John E. Sweet	1884	Syracuse, N. Y.
4	J. F. Holloway	1885	Died September 1, 1896
5	Coleman Sellers	1886	Died December 28, 1907
6	George H. Babcock	1887	Died December 16, 1893
7	Horace See	1888	Died December 14, 1909
8	Henry R. Towne	1889	New York, N. Y.
9	Oberlin Smith	1890	Bridgeton, N. J.
10	Robert W. Hunt	1891	Chicago, Ill.
11	Charles H. Loring	1892	Died February 5, 1907
12	Eckley B. Coxe	1893-1894	Died May 13, 1895
13	E. F. C. Davis	1895	Died August 6, 1895
14	Charles E. Billings	1895	Hartford, Conn.
15	John Fritz	1896	Died February 13, 1913
16	Worcester R. Warner	1897	Cleveland, O.
17	Charles Wallace Hunt	1898	Died March 27, 1911
18	George W. Melville	1899	Died March 17, 1912
19	Charles H. Morgan	1900	Died January 10, 1911
20	S. T. Wellman	1901	Cleveland, O.
21	Edwin Reynolds	1902	Died February 19, 1909
22	James M. Dodge	1903	Philadelphia, Pa.
23	Ambrose Swasey	1904	Cleveland, O.
24	John R. Freeman	1905	Providence, R. I.
25	F. W. Taylor	1906	Died March 21, 1915
26	F. R. Hutton	1907	New York, N. Y.
27	M. L. Holman	1908	St. Louis, Mo.
28	Jesse M. Smith	1909	New York, N. Y.
29	George Westinghouse	1910	Died March 12, 1914
30	E. D. Meier	1911	Died December 15, 1914
31	Alex. C. Humphreys	1912	New York, N. Y.

32 W. F. M. Goss ....1913 .... Urbana, Ill.
33 James Hartness ....1914 .... Springfield, Vt.
34 John A. Brashear ....1915 .... Pittsburgh, Pa.

It may be interesting to note that of these persons four, Nos. 1, 26, 31, 32 have been chosen from the educator class; six, Nos. 0, 2, 10, 24, 25, 28, from the consulting office practitioner and engineer or the independent designer class; twenty-three, Nos. 3, 4, 5, 6, 7, 8, 9, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 27, 29, 30, 33, 34, are from the manufacturer or works owner and manager class of producing engineer attaching to a corporation; three, Nos. 7, 11 and 18, are marine engineers. The predominance of the works manager type seems to point to the principle in American engineering practice that the same qualities which lead to eminence in engineering production are the ones which make their possessors wise choices for leadership in other directions. Mr. Alexander L. Holley has been added to the official list above, because he did the work of a President of the Society prior to its first formal election, and strenuously and positively declined the unanimous nomination to the office of first President on the ground of his unwillingness and fancied inability to meet some of the requirements of that formative year, and himself urged Dr. Thurston's election as a more fitting choice.

The following may then be presented as a brief summary of the histories of the Presidents and of the distinguishing facts of Society history under their administrations:

Alexander L. Holley. Served previous to 1880. Presided at preliminary meeting, 1880, and would have presided at the organization meeting had he been able to be present. Drafted first by-laws, first nomination of officers, active in getting first papers, and formulating initial policies. Engineer for Bessemer Steel Association, designer of types of American Bessemer steel plants machinery and details. Made Honorary Member in Perpetuity on his death in 1882. His presidential address was entitled The Field of Mechanical Engineering.

It covered the mechanical basis for production in all lines and arts of the present civilization. The advantages attaching to such a Society as respects diffusion and record of knowledge, acquaintanceship, the educational value of the practice of writing papers, and the significance of membership in it, and certain details as to qualifications and standards of membership, were also covered. He was a most acceptable occasional speaker, at dinners and elsewhere, and an attractive personality. A monument to his memory was erected by members of the engineering societies and others in Washington Square in New York City in 1890.

Prof. Robert H. Thurston. Served 1880-1881 and 1881-1882. Presided at first New York, Hartford, Altoona, second New York and Philadelphia and third New York meetings. Under him Mr. Lycurgus B. Moore was both Secretary and Treasurer, and later Treasurer only at his own request, when Mr. Thomas Whiteside Rae was chosen Secretary. The Society had no office at this time, but that of the President or Secretary. The diploma, badge and introduction card were created under Thurston; the papers were read in manuscript, illustrated by wall diagrams. Mr. R. W. Ryan, who had reported meetings of railway associations, was secured as stenographer and served through many administrations. Much of early Society policy and practice was created during Dr. Thurston's two terms. Mr. Moore asked to be relieved of his duties as Treasurer at the end of that time, and Mr. Charles W. Copeland was chosen Treasurer. Professor Thurston's two presidential addresses covered recent progress in mechanical engineering. He emphasized the fact that the American iron furnaces were making 2,000,000 tons of pig iron per annum, this comparing curiously with the output of more than 25,000,000 tons for the year 1906, and also that he felt justified in stating that the compound steam engine had not yet definitely established itself as superior in economy to the single cylinder engine. He also remarked that "steam pressure has gradually and steadily risen since the time of Watt,

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to-day 75 pounds per square inch is usual, and 90 ls is often adopted." He noticed the fact that the was slowly but steadily and inevitably being dis-l by steel," and also "that the feature of recent ess in engineering, which is attracting most atten-ınd awakening the most interest in the public mind, introduction of machine made electricity."

the discussions it also appeared that the most ·ful engines then projected were those of the steam-City of Rome, the latest development in trans-tic steamers at that time being the City of Berlin, which vessel, by the way, many of the members of ociety returned from Europe after the memorable f 1889. Both of these vessels are long since out of ›e. High-pressure steam with multiple-stage ex-ɔn was then under discussion, and a small vessel, ınthracite, had crossed the ocean with sectional s. The economy of the new principle was dis-l, and what had been done in many engineering His second address again mentions iron as being ly displaced by its younger rival, mild steel," and ; to the Forth Bridge as one of the great engineer-rojects in contemplation. The development of the mill as a substitute of the buhr stone for the grind-' flour is mentioned as worthy of note, as well as the ess of the grain elevator system for handling grain. ;pecially interesting, however, is the reference to he termed "the last established branch of our pro-ın, Electrical Engineering."

›eaking of this novel subject he says:

Ve find ourselves still in the midst of a revolution, rogress of which we are all watching with unusual ›st, the displacement of our older methods of ying light and power by a new system, which but was but the toy of science, and which comes out of ›ast utilitarian of all branches of pure physics. ı has set up his blazing sunlike arc lights in nearly large city of the world; Edison has spread a net-of conductors throughout the most densely settled

parts of New York City, distributing many thousands of his clear, mellow lights to send their soft white rays into corners never yet revealed by the feebler yellow light which they displace. It remains to be learned what is to be the cost of the new method of illumination; no figures that I consider wholly reliable have yet been given. It seems sufficiently certain, however, that the arc light is much more economical than gas—the same quantity of light being demanded—for the illumination of streets, public squares and large interiors, while interior illumination by incandescent lamps is still generally more costly than any other usual method."

Speaking of progress in marine engineering, he refers to the fact that the record holder of the day, the Alaska, was "making 18 knots regularly, closely followed by the Arizona, and the Servia in this wonderful performance."

"Nature rarely turns a sharp corner in any of her great movements. . . . It is from us, if from any body of men, that the world should expect a complete and thoroughly satisfactory practical solution of the so-called labor problem. . . . The elements of social economy are yet to become known to our people; the most obvious principles of statesmanship are yet to be learned by our legislators, and we have still to look forward to a time when our men of business and our working people shall be fairly and respectfully considered by those who direct public policy. . . .

"Such bodies as this must aid our legislative assemblies in developing a Scheme of Industrial Organization that shall exhibit highest possible efficiency—one that will prepare the children and youth of the country to enter upon lives of maximum usefulness, and to do the work that may be given them to do with ease and comfort while, at the same time, aiding them to attain health, happiness and content, even if not independence and wealth."

The author speaks for a "common school system of general education, which shall give all young children tuition in the three studies which are the foundation of

all education, and which shall be administered under compulsory law."

Professor Thurston was the first professor of mechanical engineering in the then quite young Stevens Institute of Technology, Hoboken, N. J. He won fame as an engineer in the Navy, as instructor at the U. S. Naval Academy, and in the field of consulting practice. He designed a testing machine for materials and for oil friction and built up a mechanical laboratory. He was the author of textbooks on boilers, engines, lubricants and materials of construction. Later he went to Cornell University to do as Director of Sibley College what he had done for Stevens Institute. He was a ready speaker and had always something to say which was worth while. He made an ideal president for the first two years. A bronze memorial was erected in 1911 to Professor Thurston in the foyer of the Society floor in the Engineering Building, as the first President of the Society. Nothing illustrates more graphically his charming spirit than the story which he has told of himself and his early employment in a drafting room in his home city of Providence, R. I. He had laboriously designed an engine detail by careful attention to formula and by mathematical computation of stresses in relation to material. He then presented his finished achievement to the old chief draftsman under whom he was working. The veteran looked accusingly at the tyro over his steel rimmed spectacles and heaving a deep sigh said, "Bob, I am afraid you are over-educated."

The first and second volumes of papers were issued under Thurston. They were printed by Sherman and Company of Philadelphia and the first edition of the first volume was made up by pamphlets bound together, not paged or indexed and in paper covers only. Volume II was better edited and was paged but not indexed.

E. D. Leavitt of Cambridge, Mass., served during 1882-1883. This was a very critical time in the life of the Society. The moneys received in initiation fees of new members had been treated as available current income.

ciety, he had presented its first formal paper on Friction as a Factor in Motive Power Expenses, and his novel and ingenious work in engine design, coming after his splendid work in the instruction shops of Cornell University, made him an obvious and early choice for the presidency. The tenor of his presidential address was a contrast between the achievements of literature as a world builder and those of science and mechanics.

The educated portion of the world look upon a book not merely as so much paper and printing and binding, but as the thoughtful work of the author, while the same class almost universally look upon a machine as so much wood and iron, running their minds forward to what it does, and how much it will save, and what the patent is worth, rather than backward to the brain work of its author.

Gaging the value of the thing on the democratic principle of the greatest good to the greatest number, the inventors of agricultural machinery will have few rivals. . . . "May the time come when we shall have a museum in which there shall be gathered the finest specimens of workmanship with the masterpieces of our great engineers. . . . Let us hope that if the high tide of human progress is sweeping on toward a more useful education, that the day may not be far away when he who knows what to do and how to do it will be regarded as the equal of him who only knows what has been done and who did it."

Professor Sweet's administration was one of quiet and effective progress. The Society assumed the burden of paying the rent for its office. The printing contract was transferred from Philadelphia to the house of J. J. Little and Company of New York. Professor Sweet also presided at the first meeting of the Society to be held in the assembly hall of the New York Academy of Medicine at 12 West 31st Street. This building was later the home of the Society but at this time it was leased for the sessions only. Mr. Horatio Allen, who had run the first purchased locomotive in the United States in 1830

at Honesdale on the Delaware and Hudson Railway, an Honorary Member of the Society, was present at a meeting in Professor Sweet's presidency and occupied by invitation a seat on the platform.

It was at the end of Professor Sweet's presidency that a most considerable change in Society administration was effected. The collection of dues and other income had hitherto been done by the Treasurer's office and through his clerk who was moderately salaried by the Society for his services through an allowance made to the Treasurer. This plan meant double work for the Secretary's office in keeping the Treasurer fully informed of changes in address, reasonably great chances for error, double visits by members desiring to pay dues in cash when they visited Society headquarters, and cumbrous administration generally, because books of account were in the Treasurer's office when the Council desired first hand knowledge at their meetings in that of the Secretary.

The Finance Committee urged the plan of directing the Secretary to collect income, and keep the members' ledger or register, turning over collections in gross once a month to the Treasurer and relieving him and his office of all clerical detail except that of depositing a monthly check, and of drawing checks once a month for the payment of approved vouchers. This plan was not favored by the Treasurer, but to relieve him from any embarrassment he was put in nomination for the Vice-Presidency, a promotion which his long and devoted service to the profession and to the Society well merited, and Major William H. Wiley, who had been chairman of the Finance Committee, and an advocate of the more economical policy was nominated as Treasurer. He has been regularly nominated and elected for the period of thirty years, which has since elapsed, and the policy he favored has been extended and amplified easily with the later growth of the Society. The Treasurer is the key in Society policy, by which alone can the treasury

of the Society be unlocked; but the door opens inwards to receive income with the least burden to him.

J. F. Holloway. Served 1884-1885 and presided at the Atlantic City and at the sixth Annual Meeting held in Boston, Mass. Mr. Holloway had been the moving force in the successful meeting of the Society in Cleveland, Ohio, in 1883, and his position as a designer and builder and works manager as proprietor of the Cuyahoga Works made him a fitting choice. He later came to New York as an engineer for Henry R. Worthington, which later was developed into the International Pump Company. His administration initiated a policy of having the Annual or December Meeting of the Society, of which the election of officers is the legal requirement, swing in succession through the cities of New York, Boston and Philadelphia. The advantage of a New York stated meeting and some changes in the laws of corporations which made the election compulsory within the state of the incorporation, have made New York City the city automatically selected for that meeting since these causes became operative. Mr. Holloway's presidency saw also the beginning of the definite movement to create a library of reference and of transactions of societies and technical periodicals. Mr. Henry R. Towne reported the success of the plan of a small voluntary increase of the dues ($2) for library uses, and this plan was continued until the special contribution was absorbed in a larger movement in which the need for housing the library was also a feature. The idea of a joint library building was specifically advocated in Mr. Holloway's administration in 1885. Mr. Holloway's presidential address, delivered in an assembly hall of the Institute of Technology in Boston under the title of The Mechanical Engineer, his Position and his Mission, says:

"While it is true that scientific and technical training is, and must ever be, of great advantage to the mechanical engineer there is yet another source from which, after all, he will derive by far the most benefit, and that is experience. Not necessarily his own experience, but

the experience of others, and of all ages as well. And I know of no other way in which he can be so benefited and aided all through his life.

"While none will question the value of the engineer in aiding the progress of the past, all, I think, agree that at no time in the history of the world was he so important a factor as he is to-day. Need I ask whose triumph has contributed most to the welfare of all the world—the generals who went over the Alps, or the engineers who went through them? Mont Cenis and St. Gothard answer."

Mr. Holloway was a man of rare personal charm and geniality. His sympathy for the shy stranger at meetings where he knew no one, made him beloved of all to whose relief he went so unceasingly, mixing among the young newcomers and helping them to meet those whose acquaintance would be an inspiration. He was one of the projectors of the Engineers' Club as an organization to meet purely social needs, which has now grown to such important standing. Mr. Holloway spoke easily and often wittily. He started the practice of a few introductory words before a paper was read; or he would "get discussion off the center," as he expressed it, if its presentation hung or lagged, by a brief stimulating comment. Under him was settled the policy that the Society does not "adopt" codes of procedure or other standards, but presents them, and by that procedure and the printing of them it recommends these to users and parties interested but without a compulsion. He was excelled by few Past-Presidents in his activity for the Society after his term expired; he took the most profound interest in the movement to procure a house in 1890; and the Society gave him the great honor of a special memorial session after his death in 1896.

Coleman Sellers of Philadelphia, term of 1885-1886, did not take the chair at either the Chicago or New York seventh Annual Meetings, by reason of ill-health resulting from a severe surgical operation. Mr. Henry R. Towne, as Vice-President, took his place. Mr. Sellers

was one of America's most noted mechanical engineers in his field of creative design in machine tools and mechanical construction. His firm brought over from England and advocated the flat-top shear or bed for lathes, and the worm-driven planer. They made early traveling cranes and for many years a type of boiler feeding injector. The Sellers firm also effectively backed the standard form and proportions for threads and nuts for bolts. It was at the end of Mr. Towne's service as Vice-President that the original form of application blank for membership was radically modified and the large size replaced by the folded note size since in use, and that the form of reply blank for proposers was standardized. The standard of three proposers and two seconders for a candidate was changed to the requirement of personal acquaintance by all five persons. It was also at the Chicago meeting in 1886 that the first trial was made of regulating the presentation and debate on papers so as to give every paper of a meeting a fair opportunity without crowding. The Society voted that the experiment was a success and these rules have been in use ever since with varying rigor as to their enforcement.

Mr. Sellers' annual address was presented in his absence, and was general in character. He said: "I invite your consideration of a variety of topics which appear to me germane to our organization. The engineer who counts cost as nothing as compared to the result, who holds himself above the consideration of dollars and cents, has missed his vocation. . . . I am safe in saying that no profession requires a broader education than that of the mechanical engineer. He must be a physicist, a merchant, a lawyer, a chemist, and he should know how to express himself in his mother tongue and be master of the modern languages far enough to have access to the scientific publications of other countries. . . . The engineer must of necessity be a hard student; his school days never end . . . What will fit him to enter the workshop in better condition than

now, will fit him better also for any other walk in life. . . . Education which spoils a man for his work by placing him above manual labor through false pride will continue to do him harm. Dissatisfied with the primary schools of the country, they should better prepare for the study to follow. In our schools we are cramming brains with what taxes the memory to the utmost, but which sends into our workshops boys who are themselves startled to find how little they know as compared to those who, almost ignorant of book learning, are wise in the knowledge of things about them and skilful in the use of their hands." The author approved of college sports which train eye and hand and strengthen muscles and develop manhood.

George H. Babcock, term of 1886-1887, presided at the first Washington and at the second Philadelphia Meetings, which was also the eighth Annual Meeting. He is known as the builder of sectional safety boilers of the water tube type in connection with his early friend and fellow-townsman, Stephen Wilcox. He had also designed an isochronous engine governor which was used in engines of his building. He was a tall, rather spare man, with a splendid forehead and keen Yankee eyes and a very expressive and kindly smile. He was a conscientious upholder of the tenet that the seventh day of the week was the rest day by divine appointment, and his business week had therefore only five days in it. He never was in his office on Saturdays.

His presidential address was a review of the achievements of the engineer in the subjugation of the earth with iron, with the fuels, in tunneling, in irrigation, in developing the heat engine, in electrical transmission and last of all he asks, Shall we fly? and predicts that the reduction of weight in motors per unit of power is soon to make this possible.

Horace See, whose term was of 1887-1888, presided at the Nashville Meeting, but was prevented by illness from attendance at Scranton for the ninth Annual Meeting in 1888. Mr. C. J. H. Woodbury, as Vice-President, took

his place. Mr. See was then connected with the Cramp Shipbuilding Company, and was recognized as the marine engineer and architect who first brought them fame. His annual address was presented the following spring at Erie and was a plea for productive education. The Scranton Meeting and the See administration were memorable for the visit to America of the President of the Institution of Mechanical Engineers of Great Britain and his invitation to the American Society to come in a body to London in 1889 on the way to a visit to the Exposition in Paris, that coming year. Mr. Alfred B. Couch, dying this year, made it memorable by bequeathing his professional library to the Society. It was the foundation stone of the book department of the library and the earnest of later bequests to follow.

Henry R. Towne was elected President at the Annual Meeting in December, 1888, and as such presided at the meeting in Erie, Pa., in 1889, and at the tenth Annual Meeting in New York, December 1889.

Owing to the greatly regretted illness of Mr. Coleman Sellers, during his term of office as President, 1885-1886, Mr. Towne as the senior Vice-President available, served as acting president at the Chicago meeting of May 1886, and at the seventh Annual Meeting in New York, in November, 1886, at which latter meeting he received a vote of thanks from the Society for his services as acting President "throughout the illness of President Coleman Sellers." At the Chicago meeting of May, 1886, the Rules for Debate, recommended by a committee consisting of Mr. Towne and Professor Hutton, were adopted and first put into effect, thereby making a radical change in the conduct of the Society's meetings. Previously each paper presented had been read *in extenso,* usually by its author, and the debate thereon had been without restriction, the same member frequently speaking many times in the discussion of a single topic. Under the new rule, which the acting President enforced, all papers were printed in advance, and not more than five minutes allowed for the presentation of each. Dis-

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cussions submitted in writing were limited to ten minutes for presentation, and oral discussions limited to five minutes, no member being allowed to speak twice on the same subject, except by consent. Only those who can remember the conditions which prevailed before can appreciate the change thus wrought in the conduct of the meetings. The new rules were endorsed by the Chicago Meeting, and with few changes have continued in effect ever since.

Mr. Towne's term of office as President was signalized by the visit of American engineers to Europe during the summer of 1889, on the invitation of the Institution of Civil Engineers of London, extended to the four national engineering societies of the United States, supplemented later by similar invitations from the engineering societies of France and Germany. (See Chapter XIV.)

Early in 1889 it became apparent that so many members of this Society, including in many cases the ladies of their families, proposed to participate in the European trip as to justify special provision for their transportation to Europe. Accordingly a committee of this Society, organized for the purpose, chartered the entire passenger accommodation of the Steamship *City of Richmond* (then of the Inman Line), a special sailing being arranged for the desired date. The facilities thus afforded were extended to and accepted by many members of the other three societies, the number finally participating being about three hundred. Other members of the party crossed on other steamers shortly after and joined the main body in England.

During the voyage on the *City of Richmond* the visiting party created a temporary organization by electing Mr. Towne as its Chairman, thus recognizing the leadership of this Society in organizing the excursion, and Mr. Charles Kirchhoff, of the American Institute of Mining Engineers as its secretary. The service rendered by Mr. Towne in this unexpected and then novel field, throughout the European trip, proved acceptable to the whole

membership of the party, and was fittingly and gracefully acknowledged in resolutions adopted before its departure from England. In responding to the address of welcome of M. Eiffel, President of the Société des Ingénieurs Civils of France, Mr. Towne was happily able to do so in the language of the hosts, whose hospitality was as unbounded as that which the party had received at the hands of its English hosts.

Mr. Towne's administration was also signalized by the removal of the Society's office from its earlier location in the Stewart Building at 280 Broadway, to the Mott Memorial Library building at 64 Madison Avenue, where the Society occupied the whole of the ground floor. The Society at this time employed its first stenographer and began the practice of having the Library open in the evenings. It is significant also that the Annual Meeting which closed Mr. Towne's term as President was held in the auditorium of the Academy of Medicine, 12 West 31st Street, in a building which was subsequently purchased by the Society and occupied by it continuously until the move to the present quarters in the Engineering Societies Building.

Mr. Towne had been trained for his profession in the shops of I. P. Morris, Towne and Company, and of William Sellers & Company in Philadelphia, had been a student under the late Robert Briggs, C.E., and at the Sorbonne, Paris, and as one of the founders and president of the Yale & Towne Manufacturing Company of Stamford, Conn., manufacturers of locks of every kind, builders' hardware, chain blocks, traveling cranes and testing machines, had had a wide experience in the field of mechanical engineering, and also in industrial management. He was an enthusiastic student and experimenter in economic problems, in profit or gain sharing, and in piece and contract systems of compensating labor. His paper, The Engineer as an Economist,[1] is recognized as the earliest published discussion

[1]Trans., vol. 7, p. 428.

of what subsequently became known as scientific management, and was followed by a series of notable papers on these topics. His annual address as President in 1889, reviewed the excursion of the previous summer to England and France, discussed the obligation of the Society in regard to foreign engineers visiting this country during the approaching Columbian Exposition in Chicago in 1893, and also reviewed the affairs of the Society and its future. In the latter connection he said: "We are outgrowing our industrial childhood and are rapidly approaching a period where protection, which has done so much to foster our industries, is no longer needed to the same extent as in the past; a recognition of which fact will in the near future enable us to enter in competition for the markets of the world on better terms than we have ever done before."

Mr. Towne has been an enthusiastic supporter of advanced methods in works management and has contributed several papers on this subject. In conjunction with the late Robert Briggs, he made an investigation of the subject of leather belting, the record of which was published in the Journal of the Franklin Institute in 1867, the data in which were accepted generally until superseded by the later and more complete investigations of Mr. Wilfred Lewis and others. For many years Mr. Towne took an active part in the affairs of the Society and participated in the discussions relating to a wide range of topics. At the New York Meeting of December 1901, he strenuously opposed the proposal to increase the annual dues, and submitted numerous facts and figures supporting his argument that, with proper management and accounting, the existing rate would amply suffice, the correctness of this view having since been fully demonstrated. Shortly afterwards, as an invited member of the Reorganization Committee, he was responsible for remodeling the accounting system on a basis since substantially maintained and found effective.

Oberlin Smith, 1890, presided at the first Cincinnati and the eleventh Annual Meetings, held that year in

Richmond, Va. He had been a regular attendant at meetings and a frequent participant in discussions of papers. His administration was signalized by the purchase of the house at 12 West 31st Street, New York, in whose auditorium the meetings of the Society in New York had recently been held, and the creation of the Mechanical Engineers' Library Association to act as a holding corporation and as trustees for the real estate, to which reference will elsewhere be made in further detail (See Chapter XV). His term is memorable also for the efforts to finance the proposition to purchase the home for the Society, the arranging for co-tenants to share the financial burden of its operation so as not to impair the return from the Society to its non-resident members; the controversy with one of these tenants and a legal controversy to dispossess them and the problem of furnishing and decorating the house and getting the library going. Mr. Smith's presidential address was a plea for the advancement of the engineering profession along lines of culture and personal refinement; and the inevitable consequence of ethical advance and in the influence he could thus bring to bear not alone along professional lines but in all lines in which his training would fit him to serve.

Robert W. Hunt, 1891, presided at the Providence and the twelfth Annual Meeting in New York City. He had been an associate with Mr. A. L. Holley at the Cambria and Troy Works and a co-worker of the Bessemer steel industry of the earlier day. After some fifteen years of experience as manager of iron and steel works, he had opened an office in Chicago and organized the firm of Robert W. Hunt and Company, making a specialty of tests and inspection, first principally on iron and steel products and later for all classes of engineering work. His annual address, on the Evolution of American Rolling Mills, was of the highest value both historically and technically. He referred of necessity in great fullness to the debt owing to Mr. John Fritz, later President and Honorary Member of the Society.

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Mr. Hunt was President during the first full year of ıpancy by the Society of its own house, and this year signalized by several special reunions of the ıbers. The first of these was called shortly after the ımond meeting and was made the occasion for the ıentation to the Society of the first oil portrait of its ery, the gift of the widow of Mr. Alexander L. ley and showing her husband as he appeared in his ıe at the time of founding the Society. The address ıresentation was made by the late James C. Bayles. ther later reunion of that same winter saw the ıentation of a similar portrait of Mr. Henry R. rthington, founder of the Society, the gift of his son, Charles C. Worthington, painted by Miss Huger. er meetings of that winter were centered around addsses on Robert Fulton, the Growth of the Locomotive ine; Electricity, previous to Galvani, and Egypt, and Old. Prof. Thomas Egleston also made this inistration memorable by giving to the Society the oric dining table, once the property of Robert Fulton, had given it to Dr. Egleston's sister. The applicaform for membership was also again improved and interpretation of the requirements for membership ed.

But the most important action of Mr. Hunt's term the increase of the dues of each grade of memberby $5 per annum, so that the members' dues were ed from $10 to $15 and the Juniors from $5 to $10, ı an increase in the initiation fee from $15 to $25 new members and associates and for Juniors from to $15. The matter had been carefully considered in Council and full circulars of information had been by mail to all members with a reply postal for an ression and codification of the opinion of all. The mative opinion of 651 replies in 708 showed a very stantial concurrence in the validity of the reasons for change, and a belief in the advantage of enlarging scope of the work of the Society along various lines. separate voluntary increase of dues for library de-

velopment was given up, and the Society assumed as a whole the duty of fostering this branch of its work as a stated factor of its budget. The *viva voce* vote on the question at the meeting was unanimous in its favor. In view of the great and important consequences which have flowed from the administrations of these two years they may be regarded as the most significant in the history of the Society, except only those of its first years, and those which marked the planning for the United Engineering Societies Building.

Charles H. Loring, 1892, presided at the thirteenth Annual Meeting in New York, but at the San Francisco Meeting the chair was taken in his absence by Past-President R. W. Hunt and by Vice-President, Geo. I. Alden. He was the second representative of the marine engine specialization, and had been Engineer-in-Chief of the U. S. Navy and had won fame by his experiments on the economy of the compound type of engine with the late Charles E. Emery and after his retirement had been in consulting practice. His administration was signalized by the beginning of the purchase and gift on a large scale of the purchase money bonds issued for the cash payment on the house of the Society. Portraits of Geo. H. Corliss and of John C. Hoadley were added to the house collection, and local members subscribed for the purchase of an upright piano. The possession of this latter led to some musical evenings at the house parlors, in which choral singing from words on lantern slides, accompanied by Mr. A. H. Raynal with his violin, were features. An American Society of Mechanical Engineers' quartette also took part in glees and madrigals. Other evening entertainments covered the Ericsson Monitor and her fortunes. These were purely local and were paid for by those participating in them. The Society bought some china and tableware for general use.

This winter saw the entry of Mrs. Emma C. Griffin as librarian and house-matron in charge of the whole house, and the fitting up of certain top floor rooms for

transient use of members in the city. Mr. John Fritz on passing his seventieth birthday received a congratulatory address from the Society. Mr. Loring's presidential address was a profound and scholarly treatment of the Debt of Civilization to the Steam Engine, in that it had replaced the productive energy of the human slave which underlay the civilizations of antiquity by the tireless power of the mechanical motor. Man had thereby been released for higher things and the development of his faculties, and the scope of production and of industry measurelessly broadened. The world was, therefore, the debtor of the engineer to a degree which it did not usually recognize nor reward.

Eckley B. Coxe of Drifton, Pa., served the Society for two terms, in 1893 and in 1894. He was a man of magnificent presence, had served his State in its legislature, and was deeply interested in welfare work among his mining villages. He was an anthracite mine owner and operator and had served on the Pennsylvania State Commission, to report on the utilization of coal waste from its dumps. Educated for mining in Germany, he had translated Weisbach's Mechanics and it had gotten into quite general use as a text book. It was by reason of his personality and attainments that he was chosen to be the President for the year of the Columbian Exposition in Chicago, where an International Congress had been arranged where there would doubtless be many continental engineers in attendance who spoke English perhaps with difficulty. He presided at the Chicago sessions of the Society, which were also the sessions of the mechanical section of the Congress, and at the fourteenth and fifteenth Annual Meetings in New York as well as at the Montreal Meeting in Canada in the spring of 1894. He presented only one annual address, at the close of his first term in 1893, on the Use of Small Sizes of Anthracite Coal for Generating Steam. This was based on his work as state commissioner, and referred in detail to the methods of rapid analysis, in the laboratory. The Coxe administrations centered largely

about the duties of the Society as respects the Congress and the foreign visitors. The Society coöperated in maintaining a headquarters for engineers at the Columbian Exposition, both at 10 Van Buren Street in Chicago and on the grounds in the Mines and Mining Buildings. In its own house, the auditorium was cleared of chairs, and a very elaborate collection of trade catalogues and travelers' information circulars was collected and maintained all summer. Dr. Deghuee, a competent linguist, was put in charge, and the service and convenience were greatly appreciated.

An oil painting of Dr. Reuleaux, executed by Miss Suplee from original sittings, was presented to the Society during the Coxe administration on behalf of Mr. Henry Harrison Suplee by Professor Thurston.

The courtesies and entertainment given to the members of the Society of Civil Engineers of France should also be associated with Mr. Coxe's administration. They came in a somewhat organized body with President and Secretary in September and October 1893. The expense of entertaining this party on their arrival in New York and until they reached their destination in Chicago was organized by the Society of Mechanical Engineers and carried out through members of the party who had been entertained in 1889 in France. The Society centered the courtesies of the entertainment in New York around its building and that of the Engineers' Club, then in 29th Street west of Fifth Avenue. Stephen W. Baldwin and F. R. Hutton went down the bay as representatives of the Society to meet the French steamer in the early morning, and by courtesy of the quarantine officers of the port, were allowed to go aboard to greet the party and sail with them up the bay. A feature of that sail was the enthusiastic admiration of the French engineers of the port of New York. Accustomed as they were to the conditions of a full rise of tide of twenty-six feet and the consequent necessity for dock basins, the simple and easy tying-up of great vessels to an open wharf and the consequent extent of

hulls and masts visible from the river, brought to their lips wonder and admiration—"quel commerce" as they phrased it. The Customs had also been approached by Mr. Baldwin to facilitate easy passage of the Customs routine.

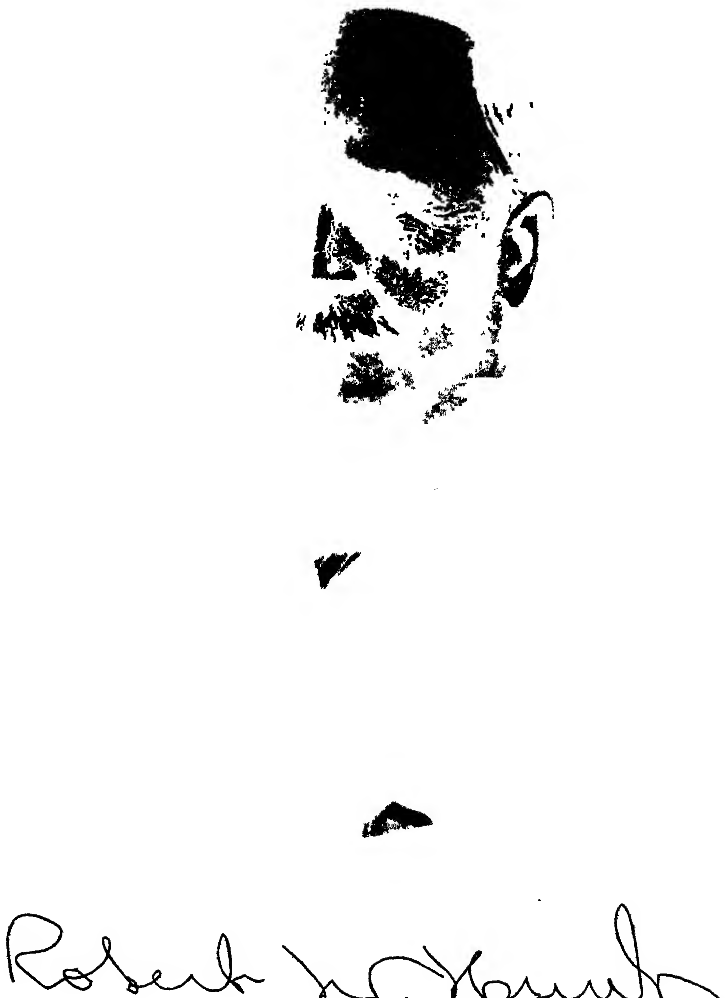
The rooms of the Society were fitted up with tourists' information circulars and catalogues. The Sunday of their arrival was left for rest and Monday morning for visits to their bankers. After lunching at the Engineers' Club, there were carriage drives in Central Park and along Riverside Drive, for there were no motor vehicles in New York City at that time. On the next day a boat trip around the harbor and to the terminal of the Pennsylvania Railroad filled the day. In the evening the party was sent forward to Detroit, where they were under the care of Mr. Jesse M. Smith, chairman of a local committee, and later to Chicago by special trains of reserved sleepers and dining cars. Special badges were made in silver for both guests and hosts, of which samples have been retained as souvenirs. The emblem was appropriately a reproduction of Bartholdi's Statue of Liberty in New York Harbor which had been a gift from the French people.

It was on the harbor sail down the East River that the President of the French Society uttered the clever three-fold commendation of the Brooklyn (or Roebling) suspension bridge, which rose to the level of genius in criticism. As he viewed it from the distance where detail was not observable, he said. "Ah, c'est beau (Ah, it is beautiful)." It appealed to his esthetic sense as suitable, graceful, and of good form. As he drew nearer, and could grasp the constructive detail, his second comment was, "C'est bien fait (It has been well executed)." The plans of its designer have been well carried out by its contractors and craftsmen who were bridge-builders by vocation. As he drew nearer still and passed under the bridge itself, his third and crowning comment was, "C'est bien étudié (It has been well thought out)." The brain and skill of the designer were revealed in the

elaborate prevision of stress and the methods of meeting it, and the midnight oil had not been burned in vain in attaining the result. These three canons of criticism can be applied to art and literature, and to all other processes which result in an embodiment of thought in visible form.

Mr. Coxe's second Annual Meeting in 1894 was the first at which the member's lapel button badge was put in operation to be used in connection with numbered lists of members in attendance. Amendments to the Rules created two classes of Associate members. It was in 1894 that Mr. Forney introduced his notable motion, looking to the holding of New York local meetings of members.

E. F. C. Davis, December 1894 to August 1895, presided only at the first Detroit Meeting and was accidentally killed while riding his horse in Central Park in midsummer. He was works manager for the C. W. Hunt Company of Staten Island, and had been a locomotive builder with the Richmond Locomotive Works, and was very efficient at the time of the Richmond meeting in 1890. He was an enthusiastic amateur in photography and gave to the Society its first satisfactory projection lantern and object lens, to supplement and replace the Secretary's earlier solution of this need. The Davis lantern remained in use until the permanent and different equipments in the Engineering Building made them superfluous and the outfit was sold to the Technical Laboratory of the Automobile Club of America for experimental purposes. On Mr. Davis's sudden death, a question of policy was brought up and settled, when a Past-President was urged as the proper incumbent *ad interim* until the succeeding election. It was the sense of the Council that a Vice-President was entitled to the honor which went with the responsibility and obligation; but as there were always six Vice-Presidents in office at one time, to which should it go? This was decided by ballot at this time on the basis of practical availability, but later the principle was formu-



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lated that the duty should attach to the Vice-President senior in age.

Charles E. Billings of Hartford, Conn., 1895, was the choice to supply the vacancy caused by the death of Mr. Davis. He presided at the sixteenth Annual Meeting in New York. He chose as his presidential address the Modern Drop Press, calling attention to the fact that the Enfield rifle made in Vermont on the interchangeable or standing system had been in use in the United States before 1854 and drop hammers for gun forgings were first used by Colonel Colt in 1853. The paper was most complete and interesting.

Monthly engineering meetings were held this year with discussions on the Gas Engine of that day, the Rapid Transit Problem in Large Cities, the Electric Motor in the Machine Shop, the Compound Locomotive and the Water Works Engineering of New York. These were financed by those participating. This administration was signalized by the gift to the Society by Miss Louisa Lee Schuyler, of the water color drawing of The Fulton, bearing Robert Fulton's autograph and the date 1813; and the oil portrait by Ballin of Capt. John Ericsson. The model of the original Monitor, gift of Thomas F. Rowland, was attached to the portrait when exhibited at the Annual Meeting.

John Fritz of Bethlehem, Pa., presided at the St. Louis Meeting and at the seventeenth Annual Meeting in New York, 1896. He had been engineer and creator of the great Bessemer steel works at South Bethlehem and later of its open-hearth and forging plants, the designer of its 125-ton steam hammer, and consulting engineer for the hydraulic compressed steel and armor and mandril forging plants and oil treatment and harveyizing departments. He was, moreover, a man of a wonderfully attractive personality, generous and self-immolating for the advantage of others. He had passed his seventieth birthday in 1892, four years before, but his modesty and self-depreciation had made him very difficult to persuade to accept honors. The Society made

him an Honorary Member in 1900 and on his eightieth birthday in 1902 coöperated in creating the John Fritz Medal Fund to keep his name alive. He died in 1913 at the age of 91.

His presidential address on the Progress of the Manufacture of Iron and Steel in America and the Relations of the Engineer to it, was a historic and technical review of the development of process and machinery, and was illustrated by a full size drawing of a modern ingot lathe with a gun jacket ingot under the tools. A hand tool, such as Mr. Fritz had used as an apprentice, was presented by him to the Society and is in its collections. On his death in 1913, many other mementoes of his activity and his friendships reverted to the Society by action of his executors.

The Society bore a hand during Mr. Fritz's administration in the effort to secure for the engineers of the U. S. Navy a recognition and precedence with proper titles, to which the importance of their service should entitle them. Mr. Holloway, Past-President, died during Mr. Fritz's presidency and a memorial session was held. The Society was asked by the superintendent of buildings of New York City to appoint representatives for a movement to revise the engineering and constructional features of the City Building Code, to take account of the new conditions in steel structures. Mr. Francis H. Stillman presented a historic model of the first dudgeon hydraulic jack of a date of 1851.

Worcester R. Warner of Cleveland, Ohio, presided at the second Hartford and at the eighteenth Annual Meeting in New York in 1897. His firm, the Warner and Swasey Company, was a builder of machine tools and optical specialties and the high class of special machinery involved in the design and construction of astronomical telescopes and range-finders. His address treated the telescope considered historically and practically, a topic on which its author is an authority.

Charles Wallace Hunt presided at Niagara Falls and at the nineteenth Annual Meeting in New York in 1898.

He was the designer and manufacturer of conveying machinery for docks and for ore and coal, an able but strict administrator, and a man of rare genial qualities. His administration was signalized by the successful experiment of trying to run a convention without the contributions of funds from a local membership and without a local committee of resident members. All features of the meeting were paid for by those attending them by the use of tickets sold by the Secretary's office at headquarters, and no obligations were incurred or burdens entailed as respects the convention city.

Mr. Hunt's address was a broad consideration of The Engineer, his practice, his development, his field and scope of work, his researches, his ethics and the debt due to him, and to applied science of which he is the representative. It was during Mr. Hunt's presidency that friends of Mr. John Fritz, Past-President, presented an oil portrait of him to the Society.

Geo. W. Melville, Rear Admiral of the United States Navy, presided at the second Washington and the twentieth Annual Meetings in New York in 1899. At the time of his election he was Engineer-in-Chief of the United States Navy, with an international reputation for his heroism on the Jeannette Arctic Expedition and for the excellency of the Navy machinery designed and built under his direction during his twelve years in office. It was his party who found the dead bodies of De Long and his comrades after tremendous endurance of the hardships of the Far North. He was a splendid military figure with long, prematurely whitened hair, the result doubtless of the exposures and stresses of those earlier achievements. The magnificent work of the Navy was then fresh in all minds, after the Spanish-American War of 1898 had been concluded by the terms of peace.

Beside the notable features of the Washington Meeting elsewhere to be referred to, the great feature of Rear Admiral Melville's administration was a movement to enlist and secure greater participation in the work of the Society by its Junior members. The idea

was to develop and utilize the talent and energy of its younger members, while at the same time training them by experience for the later participation and leadership which must be theirs. This idea like many others of equal excellence, originated with Mr. Stephen W. Baldwin, to whom so much of value in Society matters was continuously due. It took the form of a series of monthly meetings in New York City, in charge of a committee made up entirely of Junior members who were expected to procure the topics of engineering interest to be discussed and to see that the right men were requested to take part. The topics of that winter were, first, the question of the equipment and work of the repair shop and floating machine shop on the U. S. S. Vulcan situated at Guantanamo Bay with a foundry cupola aboard, presented by Mr. Pardon Armington; the second, an exhibition of the properties and behavior of liquefied air, which was then a great novelty in technical circles.

Admiral Melville's presidential address was a review of naval engineering, especially in the United States, with interesting reminiscences of the struggle to get mechanical steam power and its users into the sphere of recognition in the United States. It is a sketch and history of the engineering corps of the Navy and its final amalgamation with the Line, when it had been decided that every fighting officer in the Navy must also be an engineer. It referred to the debts owed to Mr. Charles H. Haswell, the first Engineer-in-Chief of the Navy, and to Admiral Benj. F. Isherwood, who had held the office during the Civil War of 1861-1865 and who, in addition to his great efficiency as an executive, became even more famous for his original experimental work. He spoke of the four cruisers of 1883 as the beginning of the so-called "new navy," and of the leadership of the United States in many details of engineering practice, referring briefly to improvements made during his term such as the water tube boiler, the triple screw ships, the floating workshops and the distilling ships for fresh water. In closing he pointed out that the adoption

of engineering as a requisite for every officer, making the Commander a real fighting engineer, was the highest compliment ever paid to the profession.

Gifts which signalized this year and term were the collection of valuable and, in many instances, unique books gathered together by the late W. F. Durfee which had come into the Library with their enclosing cases; and Miss Cornelia J. Carll had presented a water color sketch of canal engineering with an autographic signature of Robert Fulton, dated 1797.

Charles H. Morgan presided at Cincinnati and at the twenty-first Annual Meeting in New York in 1900. He had been an iron master, specializing in the rolling mill for wire rods, interested in the work of the Worcester Institute of Technology and its philosophy of education.

The continued Junior monthly meetings were features of this year, the Westinghouse Gas Engine, Compound Locomotives, the Diesel Motor, Gun and other Castings, and Cylinder Proportions of Multi-cylinder Engines being the topics. The reunion of Civil and Mechanical Engineers in London in June took place this year and also the subsequent separately organized trips to Paris and to Berlin. In all three cities the courtesy was most pervasive and the party greatly impressed by the efforts for their entertainment.

Mr. Morgan's presidential address, entitled Some Landmarks in the History of the Rolling Mill, was a tribute to the memory of Henry Cort and his genius, and a discussion of the development from that initiative in the continuous mill and its related machinery and furnaces.

S. T. Wellman of Cleveland, Ohio, presided at the Milwaukee Meeting and at the twenty-second Annual Meeting in New York in 1901. When the Society first came to know him, he was engineer of the Otis Steel Works of Cleveland and the host of a visiting party on the occasion of the Cleveland Meeting in 1883. He had become a representative iron master, designer and

builder of heavy machinery for furnaces, ovens, rolling mills and metallurgical establishments. He has always considered that the design and introduction of the open-hearth charging machinery and the lifting magnet which are in use in other large steel works in the world are the things for which he has the greatest claim to be remembered. These are saving great sums every year in cost of production.

The Junior monthly meetings had been continued during his term at which discussions had been held on the Laws of Construction Contracts, on the Vanderbilt corrugated locomotive fire-box, on Superheated Steam and Records for Shop and Drawing Room. The Committee on Junior Members, however, recommended that the Junior feature be dropped and a committee of all classes of members be appointed to undertake any future monthly meetings. Mr. Arthur L. Rice was made Assistant to the Secretary of the Society, to share the increasing work of his office, with particular charge of the detail of printing and publication.

Notice was given during Mr. Wellman's term at the Milwaukee meeting in May 1901 of a proposed increase of dues in the Society. This action was taken as the result of a conclusion on the part of the Council and on the part of others interested in the management of the Society that its revenues were not sufficient to meet its requirements and that, in order to maintain it in an efficient and satisfactory manner, an increase of $5 per year for Junior members and $10 per year for Members, would be the best method to reach the result. The matter of a proposed increase of dues was much discussed during the summer following. Considerable opposition to the plan developed. It was made apparent that the law of the State of New York, under which the Society was organized, gave to every member of the Society the right to be represented by proxy at any meeting and the exercise of this right led to the overwhelming defeat of the plan to increase the dues by a vote of 647 adverse votes in a total of 874 voting. As this result made it im-

Chas H. Loring

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practicable to rearrange the Society's business affairs on the basis of an increased payment by the members, other plans were naturally considered, particularly by a joint committee composed of the Executive Committee of the Council and the Finance Committee. Mr. Henry R. Towne, who had been among the prominent opponents of the plan to increase the dues, rendered valuable assistance to this joint committee, and the ultimate result was the revision of the Society's Constitution in 1904, followed later by a revision of the Society's business methods under the presidency of Dr. F. W. Taylor in 1906.

A memorial to Robert Fulton in the churchyard of old Trinity Church, New York City, took the form of a granite monument with bas-relief and suitable inscriptions in bronze. It was unveiled with proper ceremonies during the Annual Meeting. A photograph was taken, showing the monument with President Wellman, Charles H. Haswell, Prof. R. H. Thurston and Admiral Melville grouped about it. Admiral Melville delivered an address on Robert Fulton as a feature of the ceremonial. The Council first constituted an Executive Committee of its members during the Wellman administration to act in the interim of its stated meetings. President Wellman's presidential address covered the early history of Open-Hearth Steel Manufacture in the United States, with which he had been closely connected. He described the early trials and successes and illustrated the furnace construction from the five-ton furnace of the early days to the fifty-ton design of current practice and the much larger type projected.

Edwin H. Reynolds was unable by reason of ill-health to preside at either the Boston meeting or the twenty-third Annual Meeting in New York. His place was acceptably filled by Mr. James M. Dodge in Boston, and by Mr. Arthur M. Waitt in New York. The Boston Meeting was signalized by discussion on the general problems of Society management and whether a policy of control by standing committees of the Society was not a safer

one than the existing plan of less definite control by the Council as a whole, whose members could not in the nature of the case be as familiar with detail as a more compact body more frequently convened. The debate resulted in the appointment of a strong committee to revise the By-Laws (or Rules as they were then called), to report at a later meeting. This step was the beginning of the notable revision which separated the old Rules into the Constitution and By-Laws, adopted in 1904 and have since been the basis of Society organic law. The Society's methods of accounting were very carefully gone over by a joint committee of the Executive and Finance Committees, and with the coöperation of Messrs. Sargent, Page and Taylor, chartered accountants, a new set of books and systematized account headings were introduced.

In this administration were also presented the suggestion that Junior members should have their dues increased to the Members' rate after five years of membership (the plan of compelling Juniors to become full members in name after such probation was rejected); and the re-opening of discussion on the compulsory introduction of metric measures into governmental departments and into general business. Messrs. Soule and Basford were added to the Committee to revise the rules, which had been reduced to Messrs. C. W. Hunt, Jesse M. Smith and D. S. Jacobus, by the resignation of Mr. Henry R. Towne.

Mr. Reynolds was a representative of the steam engine builders of the country. Trained in the shops of Mr. George H. Corliss, he had been summoned by the Allis Company to become engineer and designer for the engines of the Corliss type which they were introducing. He had many economic successes to his credit for water works pumping stations and for electric power stations. His design had been accepted for the power station of the London Underground System, to the great dissatisfaction of the British and Continental competitors.

James Mapes Dodge of Philadelphia, Pa., presided at

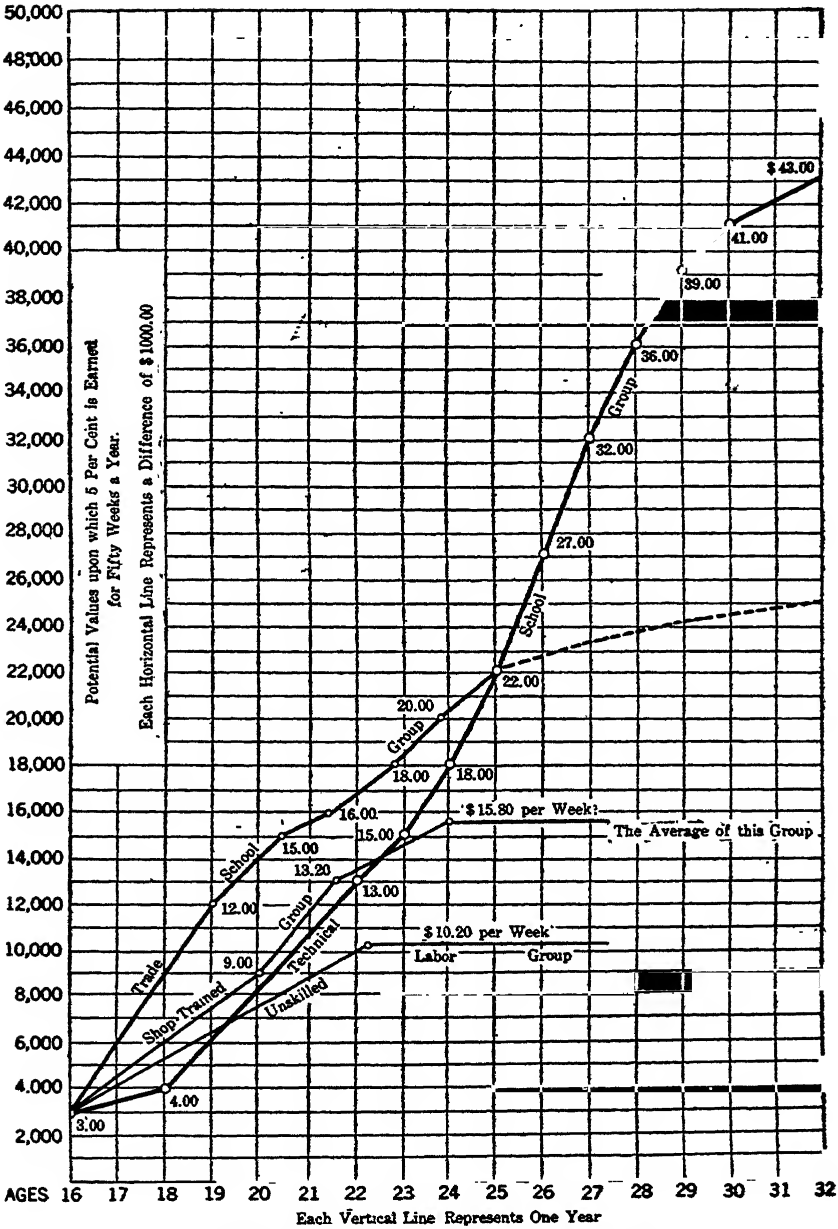
the Saratoga Meeting and at the twenty-fourth Annual Meeting in New York in 1903. It was the Dodge administration of the Society which was signalized by the announcement of the gift to the profession of engineering of the munificent sum of one and one-half million dollars for the erection of a suitable building for the housing of the Engineering Societies and the Engineers' Club. This had long been hoped for as a consummation of the dreams of the founders of the Society and others. A committee to represent the Society, in conference with representatives of the other societies, under the general designation of the Building Committee, was appointed and consisted of Messrs. James Mapes Dodge, President, Charles Warren Hunt and Frederick R. Hutton. Mr. Dodge continued as a representative of the Society until after the building was completed and his term as trustee of the United Engineering Society had to expire by the limitations of its By-Laws. Mr. Dodge is also to be credited with the conception and invention of the idea, referred to elsewhere, of having each member wear upon the lapel of his coat his name for identification at conventions. It was also in the Dodge administration that the report of the Committee on Constitution and By-Laws was presented at Saratoga, followed by its unanimous adoption by the Society then in convention and its order to letter ballot to the voting membership as a whole. Mr. Gus C. Henning was an earnest advocate of the German system of dividing the Society into sections, generally local in character, and giving to the section an importance greater than that given to the national body. Amendments to bring these changes about were offered and lost.

The Constitution (C-52) provided for the creation of sections subordinate to the national body, and under this presidency a committee of the Council had considered the necessary By-Laws and reported the policy recommending that only members of the Society could be eligible to such local sections and control all their affairs. This policy was perhaps inevitable at the time, as

members of the Society in Milwaukee and Cincinnati had formulated their ideas. A later and broader policy permitted membership and participation in the advantages of local meetings by persons not members of the Society, while retaining the idea of control and office in the section in the hands of elected members. Mr. Dodge also presented a bronze replica of a bust of Capt. John Ericsson during his administration and coöperated in securing oil portraits of James Watt, Isaac Newton and John Stephenson.

Mr. Dodge's presidential address, December 3, 1903, entitled The Money Value of Technical Training, was a novel and original presentation of the idea that the educational or school preparation of the engineer and industrialist for his life-work was a paying investment of capital so far as he was concerned, independent of the significance of such education to the community and its productive processes. A diagram showing the curve of incomes for men with different grades of education and training as their years of experience grew was the central feature of this address and was most illuminating.

Ambrose Swasey of Cleveland, Ohio, presided at Chicago at the joint meeting of the Institution of Mechanical Engineers of Great Britain and the American Society, and at the twenty-fifth or quarter-centennial Annual Meeting of the Society in New York in 1904. Chicago was chosen for the joint meeting in order to enable the visiting engineers to have a comfortable housing and a normal meeting for reading and discussion of papers, at a location which would also be en route to the Louisiana Purchase Exposition, then in progress in St. Louis. The guests were expected to arrive whenever their available time would allow and spend their time in visiting points of professional or other interest to them all over the United States, making a rendezvous of the joint meeting in Chicago. This over, they might then go to St. Louis and reach the sea coast at their convenience. An exposition city is not a wise selection for a Society meeting. Representatives of the Society were asked to



THE MONEY VALUE OF TECHNICAL EDUCATION

be on the alert for accredited members of the English Society and the headquarters in New York were again turned into a tourists' center and an office for registration for the visits which the foreigners might desire. These plans worked very well and practically. Mr. Swasey entertained the visiting members of the Council of the Institution at a handsome dinner in New York City before they started for the meeting and graciously invited the members of the Council of the American Society to act with him as hosts. The papers of the meeting were both American and British and were published in the Transactions of both societies.

An oil portrait of Prof. John E. Sweet was added to the Society's collection during this year. Mr. Swasey's presidential address was entitled, Some Refinements of Mechanical Science, and discussed the coming of the scientists' and instrument makers' standards of accuracy into the domain of the engineer, the accuracy of mechanical and measurement work involved in graduated limbs of optical apparatus, and the wave length of light as a unit of mechanical measurement.

John R. Freeman presided at the second Scranton Meeting and the twenty-sixth Annual Meeting in New York in 1905. He had won fame as a hydraulic engineer for mill and waterworks engineering and in canal and dam work, but was particularly an expert in the safeguarding of factory and other public buildings from the hazard of fire. He had been one of the Panama Canal Commission and had rendered other important public service. His presidential address was entitled, The Safeguarding of Life in Theaters, and was a masterly and exhaustive discussion of its topic, with many practical suggestions for the present and future.

The By-Laws of the United Engineering Society, the corporate body created by special charter to operate the Engineering Societies Building, were approved in this year and the mortgage for $540,000 for the land executed, and in July the contract was signed for the construction of the building. Sections of the Society were authorized

as its policy under rules for their conduct. Four engineering evenings were held in New York, discussing epochs in Marine Engineering, by Melville; the Conditions at Panama and the Reasons for a Sea-level Canal, by Warner and Burr; the Formation of Anchor Ice and Precise Temperature Measurements in Water, by Barnes; and Diamond Tools, by Henning. Mr. Freeman took a very active interest in the design of the auditorium for the new Engineering Building and made important suggestions as to its design as respects safety from fire.

Frederick W. Taylor presided at the Chattanooga Meeting and at the twenty-seventh Annual Meeting in New York in 1906. He was identified with Mr. Maunsel White with the work at Bethlehem, which resulted in the so-called high-speed tool steel, which did not lose its cutting edge at high working temperatures; and he will be remembered also for his researches into the Art of Cutting Metals, which he made the topic of his presidential address, a monumental labor and embodying his researches for twenty-five years. He was also well-known for his exposition of the philosophy of scientific management in productive establishments, based on careful time study by a skilled observer of the functions of each usual movement of the worker, and then the simplification of such motions into the fewest and best directed for their purpose. The planning or routing of work and the reduction of cost of manufacture have also been his specialties. He presented as well some most valuable researches into transmission of power by belting.

The significant events of his year in the Society were his careful study of the needs of the Society in its office routine and practice, assigning Mr. Morris L. Cooke, at his personal expense, to the working out of detail and office standard procedure as the result of such study. While this was nominally the duty of a Committee on Reorganization, consisting of Messrs. Miller, Taylor, and Hutton, Mr. Taylor really did the lion's share of the work. The result was several volumes of carefully elaborated standards, making the office routine of the Society a

model for all other similar organizations. This work, which began in the Taylor administration, lasted through the next two years before it was considered completed. The financial or accounting department has perhaps undergone the least modification in use by experience, but all standards were intended to make recurring duties as nearly automatic as possible and cause them to demand least attention from the higher and more highly paid officials. Mr. Charles Whiting Baker coöperated in much detail as respects the publication of papers and printing.

The second event was the resignation of the Secretary, who had been in office for twenty-three years, and who felt that the time had come when the Society needed for itself the full time and energies of its Secretary, and should not be compelled to share these with the engineering department of the great university with which he had been so long connected. This resignation was quietly presented in the early Spring to take effect in December or at the end of the year when election should take place. The membership was asked to make nominations, and many replied; but after much deliberation the choice fell upon Mr. Calvin W. Rice, who has since been in office. He entered at once on his duties before his election, under a title of Assistant to the Secretary, in order to familiarize himself with the duties soon to become his. Mr. Taylor's clear vision saw that a Secretary had two differing sets of duties: the one as an office manager of daily routine, and the other the more public and possibly larger duties before the public at meetings and wherever he had to represent the Society and its Council by his address and personality. He therefore proposed two functionaries to meet the case; but this idea did not find favor or commend itself generally. The office of Honorary Secretary in the Society was proposed with a view first, to keeping the experience and qualifications of a long term officer at the service of the Society, and second, to recognize the debt due to

Eckley B. Coxe

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the Secretary, for his effective service in building up the Society during the long series of years. Mr. Taylor died on March 21, 1915.

Prof. Frederick R. Hutton presided at the Indianapolis Meeting and the twenty-eighth Annual Meeting in New York in 1907. He was made President as the culmination of the twenty-four years of service to the Society as its Secretary, which he had wished to round out into twenty-five years, or a quarter of a century; but the year 1907 was the year in which the Society moved into its new location in the Engineering Societies Building at 29 West 39th Street, and it seemed proper that, having led the Society from the modest beginnings where he paid the office rent of the Society's office out of his own pocket, up through the successive stages of development and progress of floor occupancy and ownership of a whole house, its retiring Secretary should be made President that year. He therefore had the honor of presiding at the first assemblies during the Winter and Spring at the very first gathering of engineers in their splendid auditorium, of representing the Society at the formal ceremonial days of dedication, and at the first Annual Meeting in their new home. He took for his presidential address on retiring from office, The Mechanical Engineer and the Functions of the Engineering Society, and developed the thesis that the original historic definition of an engineer by Tredgold should be expanded to cover new functions for the profession that were not before the mind of the originator.

Tredgold's definition of engineering is silent upon that group of engineers concerned with the liberation, the generation and transmission of forces which are potential and are not realized in nature until some engineer has caused them to appear in accordance with natural law.

The author pointed out that while Tredgold did not include them in the "powers of nature," today there must be included "the forces which are economic or social or psychological in their application" when

"human beings become the organs and implements of the factory as a tool of production . . ." The engineer has therefore become the economic factor as he was not conceived to be in earlier days.

Any policy or step which gives occasion rightly to charge a tendency for a national body to localize, is an invasion of opportunity and value.

The author considered at length and favorably the reasons for encouraging local meetings or sections of the Society. Such sections may be either grouped territorially or by topics and common interests.

Is the privilege of service and of function all on one side, or has the Society the right to ask from its members a reciprocal duty to itself? The latter, no doubt. Professor Hutton's paper is made an Appendix to this History.

This administration was also signalized by the winding up of the Mechanical Engineers' Library Association and the sale of its real estate, and by the transfer of its assets to The American Society of Mechanical Engineers by concurrence of the Courts. The Society had therefore turned a new page in its history and set its face toward the future under a new set of conditions.

At the close of his presidency, Professor Hutton was elected Honorary Secretary under the constitutional provision which created such an office and accepted the honor conferred with the understanding that no compensation in the form of salary should attach to the office at that time. Mr. Calvin W. Rice was elected Secretary in due course when Professor Hutton became President. Professor Hutton had been a member of the building committee for the Society's building and secretary of its Board of Trustees. Besides his professional duties he had been Dean of the Engineering Faculty at Columbia University for six years, and was the author of textbooks on the Mechanical Engineering of Power Plants on Heat Engines and on the Gas Engine. He had also done much editorial writing for encyclopedias and dictionaries. He was one of the earliest engineers to take up the motor vehicle for his own use and as a professional activity.

M. L. Holman presided at the second Detroit Meeting and the twenty-ninth Annual Meeting in New York, 1908. His administration was signalized by the start of the Gas Power Section and its early sedulous activities. His presidential address discussed the Conservation Idea as applied to The American Society of Mechanical Engineers. The Congress of 1908 which had been attended by the governors and at which action initiated by this Society had been taken was the starting point of the treatment. He said that during the discussions "it became apparent that some effort would be required to keep the conference from political bias. . . President Roosevelt particularly desired the coöperation of the engineers of the United States in the movement and subsequently ascribed to the action of the engineering societies the credit of inaugurating the conservation campaign on non-political lines. . . As new parties are developed the chances of government by the minority became greater, and with a sufficient number of political parties in the field, revolutions will be the order of the day. . . One city for years discharged its sewage into the margin of a lake and took its water supply from the same place. With us, however, civil and religious liberty seems to include unnecessary exposure to disease. At the conference in Washington the preventable disease problem was practically overlooked, perhaps from the fact that no trust seems to be operating in that field. . . I venture to suggest that we might make progress by ascertaining the secret of German frugality and prosperity rather than by compiling masses of figures to prove what is well known, viz: that we are wasting the resources of Nature like a true prodigal son. . . Which one of you as householder or engineer, will put up with a poor run of coal in order that posterity may have a good coal? The departments of our government demand the best grade and are not willing to take the 'run of the mine.' . . . There is, at present, a strong tendency towards bureaucratic development that is inimical to the successful continuity of our form of government."

It concludes; the Engineering Societies must fall in with the conservation idea and see to it that the returns from the Societies are commensurate with the efforts expended in operating them.

Jesse M. Smith presided at the third Washington Meeting and the thirteenth Annual Meeting in New York in 1909. He was a patent expert and consulting engineer and had no corporate or commercial affiliations. He had been one of the experts in the historic case of a few motor vehicle engine manufacturers against the inclusive Selden patent under which the other producers had grouped themselves for common protection. His administration was memorable for his effort to emphasize the philosophy of Society management and control by its standing committees, and the adjustment of the inter-relations of such committees where their scopes met. It settled the policy of having all publication work of the Society, both Journal and Transactions, under the direction of the Publication Committee, and that the Committee on Meetings should concern itself with programs for the Annual and Semi-Annual Meetings and the acceptance of papers submitted for these meetings.

His presidential address, under the title of the Profession of Engineering, covered a review of the achievements of the profession from the past up to the present time. He quoted certain paragraphs from the admirable address of Dr. Hadley, President of a great New England University, to the effect that the men from the other centuries that went before it were its engineers. Down to the close of the eighteenth century the thinking of the country was dominated by its theologians, its jurists, and its physicians. These were by tradition the learned professions, the callings in which profound thought was needed, the occupations where successful men were venerated for their brains. This was read at the formal opening of the Engineering Building in 1907 and its recognition of a learned profession was timely and intelligent. Mr. Smith also said that the engineer capable of being at the head of the larger engineering works must

know something of many things, several things well and one thing perfectly. The American Society of Mechanical Engineers had before it a future of usefulness to its members and of influence in the profession which is unlimited. It only required that the members stand by their traditions of increasing the membership only by men of high quality as engineers; that they maintain an enthusiastic devotion to good professional work and that they coöperate with each other in the broadest and most friendly spirit to produce that solidarity of membership and devotion to high ideals which will compel the world to class the profession of engineering with the other learned professions.

Perhaps the signal feature of Mr. Smith's administration was the holding of the first local meetings of the Society, other than those in New York City. These were organized and held in Boston and St. Louis, and Mr. Smith took pains to be present and to speak on the policies which seemed to him to be sound and safe. The development of the student branches of the Society in institutions for engineering education was also a prominent feature of this year and the extension of the idea of affiliated societies which had been earnestly urged by Professor Hutton in his retiring address (see Appendix). The Thurston memorial bronze by McNeil was installed and the collection of Watt and Fulton memorabilia increased as the result of the civic celebrations of the achievements of Hudson and Fulton. The rooms of the Society were reassigned, rearranged and dedicated. Portraits of the Past-Presidents of the Society and Honorary Members were procured in standard form and hung upon the walls. Important constitutional changes were made with respect to the qualifications for Associate membership and other details of the administration.

George Westinghouse presided at the second Atlantic City Meeting and at the thirty-first Annual Meeting in New York City in 1910. He had been made an Honorary Member in 1897 by reason of his achievements in the field of safety and control of railway trains by air-brake

and by switch and signal interlocking systems, and for his achievements in electrical machinery manufacturies. He was felt to be a desirable choice for this year also by reason of the organized trip to England to take part in the meeting at Birmingham by invitation of the Institution of Mechanical Engineers. This meeting and the pleasures and courtesies growing out of it were perhaps the most notable features of the year. Mr. Westinghouse was unable to go to England but his duties as presiding officer were undertaken by Prof. W. F. M. Goss, Vice-President, and the duty of responding to a formal address at the great banquet was met by Prof. F. R. Hutton as Past-President and Honorary Secretary. A Standing Committee on Public Relations of the Society was formed under President Westinghouse. The Society took action adverse to a proposed bill in the state legislature, demanding the requirement of a license before any person could practice surveying or by implication follow other lines of engineering practice. Mr. Westinghouse's presidential address was a review of the early struggles and trials leading to the perfection of the compressed-air continuous train brake from its early conception in 1867 to the forms adaptable to trains of 100 cars in length.

Col. Edward D. Meier presided at the second Pittsburg and the thirty-second Annual Meetings, New York City, 1911. Like Mr. Westinghouse, a veteran of the Civil War of 1861-1865, Colonel Meier had been identified with the development of the steam boiler of a safety and sectional type and had been active in the American Boiler Manufacturers' Association to secure an introduction of a standard quality for vessels requiring pressure. He was responsible for the appointment of a Committee to Formulate Standard Specifications for the Construction of Steam Boilers and Other Pressure Vessels and for their Care in Service, which later was developed also into a standard for legislative control over the procedures of inspection and operation. This committee did not report until after Colonel Meier's death

in 1914 but he always considered that its appointment was one of the signal features of his year. He was also identified with the introduction of the Diesel type of internal combustion motor utilizing oil as source of fuel energy. He was a warm personal friend of the late Rudolph Diesel.

The administration was signalized by the first actual step of an affiliation process with other engineering societies and the entry of the Providence Association of Mechanical Engineers into this relation. Colonel Meier was also an earnest advocate of holding local meetings of groups of members in the various cities and labored most assiduously to advance this practice. His presidential address, under the title of The Engineer and the Future, was a plea that the engineer might be recognized more fully for the good he could do in the perplexing social and industrial problems awaiting solution. He said: "The unrest in the modern world has its basis in an underlying sense of injustice. The growing sense of community of interest, the knowledge of our dependence on each other, the ever expanding humanitarianism, are all founded on scientific facts, and are becoming world movements. They fervently and emphatically answer Cain's question: 'Thou art thy brother's keeper.'

"The engineer is responsible for the vast increase in appliances to meet every demand of that most voracious of living beings, man. The mass of mankind needs to be educated to understand and use them properly. He is in honor bound to supply this education; and as the crude dangers and fears of the earlier centuries vanished, so the prejudices and superstitions of the Dark Ages must be swept away.

"If our future professional brethren do their duty, and we know they will, the golden rule will be put in practice through the slide rule of the engineer."

Alexander C. Humphreys presided at the second Cleveland Meeting and the thirty-third Annual Meeting, New York, 1912. He was the third President to be chosen from the ranks of the engineering educators,

although his fame as an engineer rested broadly upon his achievements in gas engineering before he became president of Stevens Institute of Technology. His administration was notable for the very considerable attention paid to a revision in the Council of the existing Constitution and By-Laws, to codify the relations of the sections of the Society both professionally and geographically and to simplify the statement of standard procedure under the By-Laws. Student Branches were fostered and developed, and exchanges of international courtesies were encouraged, particularly with Germany.

President Humphreys' address was a summons to recognize the importance of the earlier and the later processes of education in developing the citizen. He quoted largely from previous addresses to show this thought had influenced his predecessors also, and urged on the profession its responsibility for the future. His closing words were: "We cannot claim that our profession is one of the three learned professions because the ignorance of the past created a limitation in favor of religion, law and medicine. But we can claim that though much of that which the engineer must have at his command is not to be learned from books, it by no means follows that his education is therefore less 'liberal' than that of the minister, lawyer or physician.

"There appears to have been a tendency, not so apparent at present, to deny to the mechanical engineer the professional position more readily conceded to the civil and mining engineer. This seems unreasonable and indefensible when we study the question and are forced to endorse Holley's claim that mechanical engineering underlies all engineering. The reason for this rather intangible discrimination is in part due, I believe, to the fact that so many of the rank and file of our department of engineering are engaged in working out the details, more or less important, of undertakings which are under the general direction of civil or mining engineers or others not members of our profession. Many mechanical engineers thus become absorbed in the inven-

tion and development of mechanical devices, possibly of vital importance in the general scheme, and so fail to take a grasp on the undertaking as a whole.

"The question of precedence need not be raised; there is credit enough for all. As engineers we are committed to the doctrine of efficiency. Efficiency must come from coöperation, not from discussions as to precedence and relative dignity. Watt's steam engine made Cort's rolling mill possible. Cort's rolling mill opened up to Watt's engine a new sphere of usefulness.

"The Panama Canal, under the direction of thoroughly capable engineers, was a failure until the bacteriologist, the physician and the sanitarian made it possible for white men to live in the fever stricken zone. Now, while under the general direction and control of military and civil engineers, the success of the undertaking largely depends upon the mechanical and electrical engineer.

"Then, while confidently asserting our claim to membership among the liberal professions, and accepting to the full the responsibilities which are thereby involved, let us be prompt to recognize that the progress of the world, material and ethical, depends upon the unselfish, intelligent and devoted coöperation in service of all professions and vocations under the leadership of men of vision, intellect, power and humanity."

Prof. W. F. M. Goss, dean of the Faculty of Engineering at the University of Illinois, brought to the office of the presidency the reputation earned as an investigator in charge of scientific research and particularly in the field of the locomotive. He had originated the great locomotive testing plant at Purdue University in Indiana, which laid the foundations for all such later work as had been undertaken by the railroads of the United States and had been copied in Europe. He was, therefore, chosen as the head of the State-wide engineering research station which had recently been established by the State of Illinois, and it has grown and flourished under his care. Much important work of development of the economy and effectiveness of

the modern locomotive has borne his impress. His administration was signalized by the visit of the organized party of the Society to the industrial productive and historic cities of Germany referred to elsewhere, under the invitation of the Verein deutscher Ingenieure. Unfortunately, his duties with respect to service on an important engineering and commercial commission to mitigate the smoke nuisance of Chicago prevented his being of the party. He presided at the Baltimore Meeting in May 1913 and at the thirty-fourth Annual Meeting in New York in December. His address was a plea for better engineering education under the title, Efficiency in Technical Education a Factor in the Development of Professional Ideals. He spoke of the progress in the appreciation of education since the Morrill Act of 1862, and how education had come to mean to the ordinary citizen more than a mere classroom exercise, and that it was to find expression in the applications of science and in the promotion of scientific research. Hence the teaching staff was to be of the highest quality of material. Nothing could be more fatal than a student-concept that his master was a mere animated slide-rule; and the claim for graduate work was most strongly urged. He concluded by claiming that the work of the schools tended to emphasize the dignity of the calling of the engineer; that it was further serving by contributing to the sum of his scientific data; that it tended to emphasize the unity of purpose of the profession, and that the problems of the school should therefore receive painstaking and persistent attention from the profession as a whole.

James Hartness of Springfield, Vt., was president at the date of the Minneapolis-St. Paul Meeting in June 1914, and at the thirty-fifth Annual Meeting in New York. He was a representative of the builders of machine tools for the rapid production of standard articles in the shop. His specialty was metal turning lathes. The flat turret lathe and the low swing lathe were invented by him as well as many other machines

and devices for metal working purposes. The patent office records attest his inventive talent in over eighty of the patents issued. In addition to the invention of metal turning mechanism, Mr. Hartness brought his ability as an inventor to bear on the problems of the astronomical observatory. The outcome of his effort is known as the turret equatorial telescope, which in design differs radically from the previous construction. The object of this invention was to protect the astronomer from the hardship of observing in cold weather in the standard observatory. Mr. Hartness' attempt was not the first one that had been made for this purpose, but in all previous attempts the designers were forced to use extra reflecting surfaces that resulted in a serious optical loss. This subject was presented to the Society in a paper in 1912. This administration was signalized by the President's assiduous interest in the welfare of the sections of the Society and by the preparations for the Engineering Congress at San Francisco, incident to the opening of the Panama Canal. The first vessel passed through the canal in this year.

But most noteworthy of all was the creation by Mr. Ambrose Swasey of Cleveland, a former president of the Society, of The Engineering Foundation for the advancement of engineering. This was a gift of $200,000, to be held in trust and administered by a Board of Trustees, for the promotion of engineering research in all of its professional lines, in the mechanical laboratory or in the field or the library, or wherever the need and opportunity were most pressing. Mr. Swasey's ideas were most broad and far-seeing, both as respects the present and the future. He early decided that the scope of the work to be done on such a foundation should be broader than that delimited by even a wide definition of the term mechanical engineering; and he found ready to his hand the Board of Trustees of the United Engineering Society, a body representing all specializations of engineering, the fields of mechanical, electrical and mining engineering and metallurgy. To that body he

entrusted the development of his ideas in detail, and set an example of wise generosity for others to follow. The work of this Engineering Foundation should be a noteworthy factor in the development of engineering science in the history of the future. Some features of The Engineering Foundation will be referred to under the administration of Dr. Brashear.

Mr. Hartness' presidential address bore the title, The Human Element, the Key to Economic Problems. He called attention to the fact that the engineer in a modern industrial civilization was necessarily a director of men and there was therefore imposed upon him the necessity for careful consideration of the human factor. The vast scope of knowledge of applied science made it imperative that he should make no attempt to assimilate more than he could effectively carry and utilize. This of necessity carried with it a dependence upon others for information in certain directions. The choice which every man makes of that which he will keep for himself and of that which he will expect to get from others determines the man himself.

He then went on to discuss the factor of habit in the human unit. Quoting from his paper, "One of the striking facts brought out by this study of the nature of the individual is that man is a creature of habit to such an extent that there is always a great factor of inertia to be encountered in all our plans for changing his mental attitude or plan of action.

"Skill, dexterity and facility in performance of work are due to acquired habit; but habit is more than a mode by which we do easily what we do often; it is also a disposition and an aptitude for work. It brings an involuntary tendency to continue and with it an ease and reliability of performance.

"There is no more clearly demonstrated fact in this world than that specialization is the method by which human energies are most efficiently used.

"There is nothing more harmful to the thinker or the

E. F. C. Davis

PRESIDENT 1895

OF

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

r than to force him to become a tramp either in the l or the physical sense.

'his law of human economics is also one of indus-conomics. It is one of those laws that we have too disregarded.

'f course we can keep monopolies out of our y, but we cannot keep them off the face of the

/e should employ every means to aid us in manag-t only our own selves, but all those whom we direct. ecomes the rule of success of human activity, both ıpplication to the individual and to large groups as ented in industries, in states, and in countries. ıver these elements or units are in competition, s goes to the unit which takes advantage of this ıdge of the inner motives, and it is the study of man being that presents to us the facts from which ı most accurately determine what is for the best ıt of the man and society in general.

ı it not possible that we may live to see the day labor organizations and manufacturers, and last t least, the ultimate user—the general public—shall d that the work be done by methods under which rorker is most favorably conditioned and by which eatest value is produced by a given effort?"

. *John A. Brashear* of Pittsburgh, Pa., was elected ent at the thirty-sixth Annual Meeting in New City, December 1914. His original work in the ın of the most difficult problems of optical science o the astronomer, the physicist, the scientist and gineer the means of demonstrating truths which usly had been but scientific theories. An example fessor Keeler's discovery of the constitution of ı's rings by use of Brashear's spectroscope. An-example is the measurement of the wave length of by Morley and Michaelson's Interferometer by Brashear's prisms and mirrors. He inherited a love for astronomy and in early manhood success-constructed refracting and reflecting telescopes,

doing all the optical work at his own home. Professor Langley of Washington early became interested in Dr. Brashear's work and in coöperation with Mr. William Thaw of Pittsburgh his establishment was moved to Allegheny and in it was made much of the experimental equipment for Langley's research in the domain of radiant energy and particularly in the field below or beyond the red end of the solar spectrum. These qualified him for his suggestions in relation to the problem of organic life on the earth. Here also was done much of his pioneer work in aeronautics and aerodynamics. Dr. Brashear made the plates for the diffraction gratings of Professor Rowland of Johns Hopkins which became so celebrated. More than 100 of the great telescope objectives of the world including some of the largest astrophotographic lenses have been made in the Brashear workshops as well as most of the telespectroscopes for the world's observatories. Dr. Brashear always likes to include the skill and energy of his son-in-law, Mr. James McDowell, who has been a ruling spirit in the refinements of their optical output. The 30-inch objective glass for the observatory in Allegheny is said to be the most perfect glass in the world today. Dr. Brashear has also been greatly interested in educational work in connection with the Carnegie Institute and other ways, and has been director and trustee in foundations of this class. He is a man of rare personal charm, of the highest abilities and his reputation is world-wide.

This history is completed in the beginning of Dr. Brashear's administration in Society affairs. It has already been signalized by the public announcement and legislative action which has made available the gift of Mr. Ambrose Swasey of the sum of $200,000 to be used in the prosecution of engineering research. Mr. Swasey directed that that administration of the income from this foundation and the control of the fund should be in the hands of the United Engineering Society, of which The American Society of Mechanical Engineers is a constituent part. The Institute of Mining Engineers and

the Institute of Electrical Engineers form the other two bodies represented in the Board of Trustees of the United Engineering Society. The latter has directed that the fund be administered and the research conducted by a board to be known as The Engineering Foundation Board. This Foundation Board is to consist of eleven persons, elected to office by the Board of Trustees of the United Engineering Society and made up as follows: One member from each society represented on the Board of Trustees of the United Engineering Society on its own nomination; one member from the same represented organization nominated by its governing body; two members elected by the Board of Trustees of the United Engineering Society shall be upon the nomination of the governing body of the American Society of Civil Engineers; and two members selected at large. The President of the Board of Trustees of the United Engineering Society shall be a member of the Foundation Board *ex officio.*

The public announcement of the creation of this fund and of the organization of the Foundation Board was made at a public meeting held in the Engineering Societies Building in New York City on the evening of Wednesday, January 27, 1915, at which addresses were delivered by Dr. Henry S. Pritchett, President of the Carnegie Foundation for the Advancement of Teaching; by Mr. Robert W. Hunt and by Dr. Alex. C. Humphreys, Past-Presidents of The American Society of Mechanical Engineers, representing respectively the Society of Civil Engineers and the institutions of engineering education. Mr. Gano Dunn, President of the Trustees of the United Engineering Society and a member of the new Foundation Board by virtue of his office, presided and spoke fittingly of the possibilities of progress which might be realized through such a gift. On the platform beside Mr. Ambrose Swasey were the members of the Board of Trustees, representatives of the Society of Civil Engineers, of the John Fritz Medal Corporation and of the national engineering societies.

An occasion most memorable to those who were privileged to enjoy it was a private dinner tendered to Mr. Swasey as the first donor of an engineering foundation by an engineer and held on the evening previous in the University Club in New York City. Those who were privileged by invitation to be present at this dinner were persons distinguished each in his own line of work. Those who were to speak for the profession of engineering at the formal opening were Dr. Henry S. Pritchett, Robert W. Hunt and Dr. Alex. C. Humphreys; and representing the Trustees of the United Engineering Society, past and present, were Dr. A. R. Ledoux, the first President of the Board; Mr. C. F. Scott who had been Chairman of the Building Committee before the Board was organized; Dr. S. S. Wheeler, active in the legislative work of the first Building Committee; Messrs. H. H. Barnes, F. R. Hutton, J. F. Kent, John W. Lieb, Jr., Fred J. Miller, C. F. Rand, Jesse M. Smith, B. B. Thayer and Joseph Struthers. Mr. Gano Dunn, President of the Trustees, presided at the dinner and acted as toastmaster.

Representing the engineering societies were Dr. John A. Brashear, President of The American Society of Mechanical Engineers, Prof. John E. Sweet, Past-President and Fritz Medalist, Messrs. James Hartness, C. O. Mailloux, John R. Freeman, Charles Warren Hunt, Secretary of the American Society of Civil Engineers, Paul M. Lincoln, President of the American Institute of Electrical Engineers, Bradley Stoughton, Secretary of the American Institute of Mining Engineers, Calvin W. Rice, Secretary of The American Society of Mechanical Engineers, F. L. Hutchinson, Secretary of the American Institute of Electrical Engineers and Stephenson Taylor, President of the Engineers' Club of New York. There were also present Mr. T. A. Rickard of London, England, Mr. E. D. Adams, Mr. John Hays Hammond, Dr. M. I. Pupin. Many brief speeches were made in recognition of what Mr. Swasey's gift was to mean and at the close Mr. Swasey responded

in brief and modest terms. A most striking and satisfactory portrait of Mr. Swasey was given to the diners as they left the room and he was kept busy affixing his autograph. Mr. Andrew Carnegie, Dr. R. W. Raymond, Dr. R. S. Woodward, Mr. W. R. Warner and Mr. J. J. Carty had been invited to be present, but were unable to accept.

CHAPTER VII

The Council of the Society

Vice-Presidents, Managers, Secretaries and Treasurers

The Council of the Society has from the beginning included six persons, serving two years each, as Vice-Presidents, and nine persons, with title of Manager, serving three years each. These classes were each divided into groups, two in the Vice-Presidential grade and three in the grade of Manager, so that of the fifteen members so serving only five go out of office in any one year. As a result continuity and a familiarity with former precedents have always been factors of effectiveness.

It has also been the custom to choose Vice-Presidents each year from those who were recognized as presidential possibilities, so that if promotion to the office of President should come, it would find the incumbent with previous experience of service on the Council. In comment on the succeeding lists, therefore, there are many who have served in all three of the offices as manager, vice-president and president. There must also be many others still living whose notable achievements in lines other than those familiar to one observer will make any chronicle incomplete and unsatisfying; and furthermore such persons may be too near to the eye to be fairly judged, particularly by an intelligence biased by friendly admiration.

With these apologies the list of officers of the Society is presented in its entirety, and after it some comment on the achievements and service for which such persons are to be remembered.

Chas W Copeland

TREASURER 1881-1884

OF

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

VICE-PRESIDENTS

1 Henry Rossiter Worthington.......April-December, 1880
2 Coleman Sellers ....April, 1880—November, 1881
3 Eckley B. Coxe.............April, 1880—November, 1881
4 Quincy A. Gillmore.........April, 1880—December, 1880
5 Wm. H. Shock..............April, 1880—November, 1882
6 Alexander L. Holley.........April, 1880—January, 1882
7 Francis A. Pratt........December, 1880—November, 1881
8 Theo. N. Ely.....................1881—November, 1882
9 Washington Jones ....1881—November, 1882
10 Wm. P. Trowbridge...............1881—November, 1883
11 E. D. Leavitt.....................1881—December, 1882
12 Chas. E. Emery..............................1881-1883
13 S. B. Whiting...............................1882-1883
14 John Fritz 1882-1884
15 Henry Morton 1882-1884
16 Wm. Metcalf 1882-1884
17 A. B. Couch.................................1883-1885
18 W. R. Eckart................................1883-1885
19 J. V. Merrick...............................1883-1885
20 Chas W. Copeland............................1884-1886
21 Henry R. Towne..............................1884-1886
22 Coleman Sellers 1884-1885
23 Olin H. Landreth............................1885-1886
24 Allan Stirling 1885-1887
25 Horace See 1885-1887
26 Chas. H. Loring.............................1885-1887
27 Jos. Morgan, Jr.............................1886-1888
28 Chas. T. Porter.............................1886-1888
29 Horace S. Smith.............................1886-1888
30 W. S. G. Baker..............................1887-1889
31 H. G. Morris................................1887-1889
32 C. J. H. Woodbury...........................1887-1889
33 Thos. J. Borden.............................1888-1890
34 William Kent 1888-1890
35 Charles B. Richards.........................1888-1890
36 De Volson Wood..............................1889-1891
37 Joel Sharp 1889-1891
38 Geo. W. Weeks...............................1889-1891
39 Stephen W. Baldwin..........................1890-1892
40 Alex. Gordon 1890-1892
41 Jno. F. Parkhurst...........................1890-1892
42 George I. Alden.............................1891-1893
43 E. F. C. Davis..............................1891-1893
44 Irving M. Scott.............................1891-1893
45 Charles Wallace Hunt........................1892-1894
46 Edwin Reynolds 1892-1894
47 Thos. R. Pickering..........................1892-1894
48 Percival Roberts, Jr........................1893-1895
49 H. J. Small.................................1893-1895
50 Charles E. Billings.........................1893-1895

51	Frank H. Ball	1894-1896
52	M. L. Holman	1894-1896
53	Jesse M. Smith	1894-1896
54	Francis W. Dean	1895-1897
55	Charles H. Manning	1895-1897
56	George W. Melville	1895-1897
57	Edwin S. Cramp	1896-1898
58	W. F. Durfee	1896-1898
59	S. T. Wellman	1896-1898
60	Charles M. Jarvis	1897-1899
61	Walter S. Russel	1897-1899
62	John C. Kafer	1897-1899
63	E. D. Meier	1898-1900
64	George R. Stetson	1898-1900
65	B. H. Warren	1898-1900
66	Jesse M. Smith	1899-1901
67	Stevenson Taylor	1899-1901
68	David Townsend	1899-1901
69	James M. Dodge	1900-1902
70	Ambrose Swasey	1900-1902
71	Arthur M. Waitt	1900-1902
72	M. E. Cooley	1901-1903
73	Wilfred Lewis	1901-1903
74	M. P. Higgins	1901-1903
75	James Christie	1902-1904
76	F. H. Daniels	1902-1904
77	John R. Freeman	1902-1904
78	D. S. Jacobus	1903-1905
79	William J. Keep	1903-1905
80	M. L. Holman	1903-1905
81	S. M. Vauclain	1904-1906
82	H. H. Westinghouse	1904-1906
83	Fred. W. Taylor	1904-1905
84	Geo. H. Barrus	1905-1906
85	Walter M. McFarland	1905-1907
86	Robt. C. McKinney	1905-1907
87	Edward N. Trump	1905-1907
88	Philetus W. Gates	1906-1908
89	John W. Lieb, Jr.	1906-1908
90	Alex Dow	1906-1908
91	L. P. Breckenridge	1907-1909
92	Fred J. Miller	1907-1909
93	Arthur West	1907-1909
94	Geo. M. Bond	1908-1910
95	R. C. Carpenter	1908-1910
96	F. M. Whyte	1908-1910
97	Chas. Whiting Baker	1909-1911
98	W. F. M. Goss	1909-1911
99	E. D. Meier	1909-1910
100	Alex. C. Humphreys	1910-1911
101	Geo. M. Brill	1910-1912

102	Edwin M. Herr	1910-1912
103	Henry H. Vaughan	1910-1912
104	Wm. F. Durand	1911-1913
105	Ira N. Hollis	1911-1913
106	Thos. B. Stearns	1911-1913
107	I. E. Moultrop	1912-1914
108	H. G. Stott	1912-1914
109	E. B. Katte	1913-1914
110	H. L. Gantt	1913-1915
111	E. E. Keller	1913-1915
112	H. G. Reist	1913-1915
113	Henry Hess	1914-1916
114	Geo W. Dickie	1914-1916
115	James E. Sague	1914-1916

MANAGERS

1	Wm. P. Trowbridge	April, 1880—November, 1881
2	Theo. N. Ely	April, 1880—November, 1881
3	J. C. Hoadley	April, 1880—November, 1881
4	Washington Jones	April, 1880—November, 1881
5	Wm. B. Cogswell	April, 1880—November, 1882
6	Chas. B. Richards	April, 1880—November, 1882
7	S. B. Whiting	April, 1880—November, 1882
8	E. D. Leavitt, Jr.	April, 1880—November, 1882
9	J. F. Holloway	November, 1880—November, 1883
10	Geo. W. Fisher	November, 1880—November, 1883
11	Allan Stirling	November. 1881—November, 1884
12	Geo. H. Babcock	1881—November, 1884
13	S. W. Robinson	1881—November, 1884
14	John E. Sweet	1882-1883
15	Robt. W. Hunt	1882-1885
16	Chas T. Porter	1882-1885
17	C. J. H. Woodbury	1882-1885
18	W. F. Durfee	1883-1886
19	Oberlin Smith	1883-1886
20	C. C. Worthington	1883-1886
21	Wm. Lee Church	1884-1887
22	Wm. Hewitt	1884-1887
23	Chas. H. Morgan	1884-1887
24	Hamilton A. Hill	1885-1888
25	William Kent	1885-1888
26	Saml. T. Wellman	1885-1888
27	John T. Hawkins	1886-1889
28	Fredk. G. Coggin	1886-1889
29	Thos. R. Morgan, Sr.	1886-1889
30	Stephen W. Baldwin	1887-1890
31	Fredk. Grinnell	1887-1890
32	Morris Sellers	1887-1890
33	Frank H. Ball	1888-1891
34	Geo. M. Bond	1888-1891
35	Wm. Forsyth	1888-1891

36 Jas. E. Denton....................................1889-1892
37 Carleton W. Nason..............................1889-1892
38 H. H. Westinghouse...........................1889-1892
39 Andrew Fletcher 1890-1893
40 Worcester R. Warner..........................1890-1893
41 Coleman Sellers, Jr.............................1890-1893
42 Jas. M. Dodge.....................................1891-1894
43 Robt. Forsyth 1891-1894
44 Jesse M. Smith....................................1891-1894
45 John Thompson 1892-1895
46 Charles W. Pusey................................1892-1895
47 Charles H. Manning............................1892-1895
48 John B. Herreshoff.............................1893-1896
49 Lebbeus B. Miller...............................1893-1896
50 Walter S. Russel.................................1893-1896
51 Charles A. Bauer................................1894-1897
52 Arthur C. Walworth............................1894-1897
53 John C. Kafer......................................1894-1897
54 Geo. W. Dickie....................................1895-1898
55 E. D. Meier..1895-1898
56 Norman C. Stiles.................................1895-1898
57 A. Wells Robinson...............................1896-1899
58 H. S. Haines...1896-1899
59 G. C. Henning......................................1896-1899
60 J. B. Stanwood.....................................1897-1900
61 H. H. Suplee..1897-1900
62 Geo. Richmond 1897-1900
63 Edgar C. Felton...................................1898-1901
64 A. M. Goodale......................................1898-1901
65 Richard H. Soule.................................1898-1901
66 Francis H. Boyer.................................1899-1902
67 John A. Brashear.................................1899-1902
68 Alfred H. Raynal.................................1899-1902
69 W. F. M. Goss.......................................1900-1903
70 D. S. Jacobus..1900-1903
71 De Courcy May.....................................1900-1903
72 Charles H. Corbett..............................1901-1904
73 H. A. Gillis...1901-1904
74 R. S. Moore..1901-1904
75 Robt. C. McKinney..............................1902-1905
76 Newell Sanders 1902-1905
77 S. S. Webber...1902-1905
78 John W. Lieb, Jr...................................1903-1906
79 Asa M. Mattice.....................................1903-1906
80 Geo. I. Rockwood.................................1903-1906
81 George M. Brill.....................................1904-1907
82 Fred J. Miller..1904-1907
83 Richard H. Rice....................................1904-1907
84 Walter Laidlaw 1905-1908
85 Fred M. Prescott..................................1905-1908
86 Frank G. Tallman.................................1905-1908

87	G. M. Basford	1906-1909
88	Andrew J. Caldwell	1906-1909
89	Andrew L. Riker	1906-1909
90	Wm. L. Abbott	1907-1910
91	Alex C. Humphreys	1907-1910
92	Henry G. Stott	1907-1910
93	H. L. Gantt	1908-1911
94	I. E. Moultrop	1908-1911
95	W. J. Sando	1908-1911
96	J. Sellers Bancroft	1909-1911
97	James Hartness	1909-1912
98	H. G. Reist	1909-1912
99	Henry G. Stott	1911-1912
100	D. F. Crawford	1910-1913
101	Stanley G. Flagg, Jr.	1910-1913
102	E. B. Katte	1910-1913
103	Charles J. Davidson	1911-1914
104	Henry Hess	1911-1914
105	George A. Orrok	1911-1914
106	Alfred Noble	1912-1914
107	H. M. Leland	1912-1915
108	W. B. Jackson	1912-1915
109	A. M. Greene, Jr.	1913-1916
110	John Hunter	1913-1916
111	Elliott H. Whitlock	1913-1916
112	Charles T. Main	1914-1917
113	Spencer Miller	1914-1917
114	Max Toltz	1914-1917
115	Morris L. Cooke	1914-1917

VICE-PRESIDENTS

(1) One of the founders of the Society. Would have been made a president had he lived. Originated the duplex non-flywheel pump and the single pump with steam driven slide valve. Built many waterworks pumping engines.

(2) and (3) See Presidents.

(4) Military engineer, writer on Cements and Building stones, highways and fortifications; helped fortify New York in 1861.

(5) Naval engineer; author of book on boilers, condensors, etc.

(6) See Presidents.

(7) Founder of firm Pratt and Whitney, builders of machine tools and gages, guns and contract work.

(8) Superintendent of motive power, Pennsylvania Railroad.

(9) With I. P. Morris, shop superintendent and engineer for big engines.

(10) Vice-President of Novelty Iron Works after army training and work to fortify New York in 1861. Then professor of engineering at Yale and Columbia Universities; author.

(12) Navy and Revenue marine; conducted boiler tests at Centennial exposition 1876 and established unit of boiler horse-power; engineer New York Steam Company.

(13) Engineer for coal-mining company and Calumet and Hecla Copper Company.

(15) First president, Stevens Institute of Technology, and expert in physics; gave largely to build up Institute.

(16) Steel expert in crucible processes.

(17) Machine tools with Bement of Philadelphia; gave his library to A. S. M. E.

(18) Naval engineer; went to California and was active in mining machinery waterworks and cable railway machinery.

(19) Pumping and other large machinery, turbines and contracts.

(20) Naval engineer, designing engines for waterworks and vessels. Originated the gallows frame for paddle-vessels, and with Stevens the lozenge open-framed beam and the tappet and toe for such engines and their valve gear, modifying the Fulton engine for smooth water vessels.

(22) Professor of engineering at Vanderbilt and Union Colleges.

(24) Designer of Stirling Water tube boiler. First engineer of New York Elevated Railroad.

(27) Steel works, engineer and manager; developed furnaces and machinery at Cambria Iron Works.

(28) Originator of high-speed steam engine designs; authority on use of indicator for engines; designer of weighted governor to secure isochronism; expert in testing.

Lycurgus B. Moore

TREASURER 1880-1881

OF

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

(29) Steel works engineer.

(30) Works manager; car wheel manufacturer.

(31) Consulting engineer; worker on storage batteries for street railways.

(32) Insurance expert; researches into mill construction and fire protection, later telephone engineer.

(33) Mill engineer and builder; later automatic sprinkler fire extinguishers.

(34) Steel engineer, boiler expert, author of engineers' pocketbook; professor of engineering at Syracuse University.

(35) Designer of Richards indicator; first testing machine at Colt's Armory; president of Southwark Foundry; professor at Yale University.

(36) Professor at Stevens Institute; author on materials and thermodynamics.

(37) Buckeye Engine Works' president.

(38) Manufacturer of wire-cloth and textile mill manager. Made bequest to Library, A. S. M. E.

(39) N. Y. representative, Pennsylvania Steel Company; served A. S. M. E. as Chairman of its Finance Committee for 18 years; as chairman of many nominating committees and other special Society committees and responsible for many details of policy. Largely the donor of the Hoadley collection of instruments and apparatus.

(40) Engine and tool builder, iron works practice.

(41) Machine tools.

(42) Professor at Worcester Institute, designer of machinery emery wheels and plunger elevators.

(44) Works manager for Union Iron Works at San Francisco. Responsible for engines of U. S. S. Oregon which came round the Cape at full speed in 1898 to reach Santiago.

(47) Inventor of spring governor.

(48) Steel works engineer, owner and manager.

(49) Superintendent of motive power, Pacific Coast Railways.

(51) Engine designer, works manager and owner; designer of dynamometric and flywheel shaft governor.

(54) Consulting engineer, designer of boilers, engines and power plants.

(55) Naval engineer, mill engineer, designer of Manning boiler.

(57) Shipbuilder.

(58) Engineer for Kelly in first U. S. Pneumatic steel making process and for Ward of Detroit; engineer for Wheeler and Wilson Company and Mitis Casting Process, for C. W. Hunt Company. Gave by partial purchase his unique library to the Society and his collection of drawings to A. S. M. E. and to Columbia University.

(60) Bridge maker.

(61) Works manager and car wheel manufacturer.

(62) Naval engineer and for Morgan Iron Works; Treasurer for the building fund of Engineering Societies; leader in the land purchase and for the Engineers' Club.

(64) Manufacturer of twist drills and related products; manager electric lighting and power company.

(65) Manufacturer of injectors, engineer for Yale and Towne and Westinghouse Company. Formerly naval engineer.

(67) President and engineer for works building passenger and freight vessels for river and coast-wise service with W. A. Fletcher and Quintard Iron Works, President Webb Academy for shipbuilders and the Society of Naval Engineers and Marine Architects.

(68) Manufacturer of bolts and nuts.

(71) Superintendent of Motive Power, New York Central and Hudson River Railroad.

(72) Ex-naval engineer; professor, State University of Michigan.

(73) Manufacturer and engineer; expert for Wm. Sellers and Company.

(74) Educator and head of shop manufactory of the Worcester Institute; promotor of half-time schools for

apprentices; engineer plunger elevator and Norton emery wheel.

(75) Steel and bridge maker.

(76) Wire and rod mill expert and manufacturer.

(78) Professor in experimental engineering laboratory of Stevens Institute; boiler expert; most active in committee work and in papers and discussions before A. S. M. E.

(79) Expert in cast iron; manufacturer of stove plate and thin and decorative cast iron; devised testing machines for test ingots; active in committee work.

(81) Locomotive builder with Baldwin Company and shop superintendent; expert designer of compound locomotives and locomotive valve gear.

(82) Air brake expert and manufacturer; engineer of firm for installing power plants. Brother of George Westinghouse.

(85) Ex-naval engineer; engineer for Westinghouse Companies.

(86) Machine tool builder.

(87) General superintendent of Solvay Process Company, engineer, expert and manufacturer.

(88) Foundry and machine works.

(89) Electric engineer and power plant manager; assistant to Edison and introducer of Edison lighting system into Italy.

(90) Electric lighting plant engineer.

(91) Professor and expert; head of experimental engineering laboratories at University of Illinois and at Yale.

(92) Editor *American Machinist;* factory manager; builder of machinery and tools.

(93) Builder of large gas engines.

(94) Designer and builder of standards of length and comparators for testing accuracy of gages.

(95) Professor of experimental engineering; author.

(96) Superintendent of railway motive power.

(97) Engineering editor and expert; designer of special machinery.

(100) Power plant expert and consulting engineer.

(102) Expert in transportation problems.

(103) Consulting engineer.

(104) Ex-naval engineer; professor of marine design.

(105) Ex-naval engineer; professor of engineering, Harvard University; President Worcester Institute.

(106) Mining machinery.

(107) Power plant engineer; electric lighting and power generating and management.

(108) Engineer for subway power plants in New York City.

(109) Railway engineer and expert specialist in electrification of trunk lines.

(110) Specialist in works management and economic production; originator of a bonus system for paying labor.

(111) President of electric wire manufacturing plant.

(112) Electrical engineer; designer electric machinery.

(113) Manufacturer and designer, specializing in ball bearings.

(114) Marine engine designer, builder and works manager.

(115) Locomotive and railway expert; public service commissioner.

MANAGERS

In the list of Managers will be found a large number repeating from the foregoing lists, as the practice of promoting managers to Vice-Presidents was very frequently followed.

(3) Designer of the first single-valve automatically regulating steam engine with flyball governor on the revolving flywheel shaft. His first engine exhibiting this principle and a feature of the Centennial of 1876 is in the possession of Columbia University as a model.

(5) Mining engineer and chemical manufacturer; managing director of Solvay Process Company.

(10) Consulting engineer in general practice in St. Louis.

(13) Professor, Ohio State University, and railway commissioner of his State.

(20) Son of H. R. Worthington and successor; donor of memorial hydraulic laboratory to memory of his father at Columbia University.

(21) Of the firm of Westinghouse, Church, Kerr and Company.

(22) With Cooper, Hewitt and Company as engineer in steel and iron construction work, wire works and wire rope conveyors.

(24) Engineer-salesman, supplying machine tools.

(27) Ex-naval engineer and manufacturer.

(28) Mining and metallurgical engineer and ore-dressing mill man.

(29) Builder of heavy machinery, shears and presses and rolling mills, drove his traveling cranes with a square shaft.

(31) Fire extinguishers and automatic sprinklers.

(32) Railway supplies.

(35) Railway motive power.

(36) Professor at Stevens Institute in the experimental engineering laboratory; expert before the courts.

(37) Steam and hot water heating; traps.

(39) Head of the W. and A. Fletcher Company, making marine engines for the Hudson River service, for ferries and Long Island Sound and elsewhere. Designer of Mary Powell engines.

(41) Son of Coleman Sellers; in same line of work.

(43) Metallurgical engineer and rolling mills.

(45) Printing presses of high class; water meters.

(46) Marine engines and machinery for colonial industries.

(48) Chemical engineer and works manager.

(49) Manufacturing engineer with Singer Sewing Machine Company.

(51) Manufacturer of steam engines.

(52) Steam and water heating, machinery tools and materials.

(54) Chief engineer, Union Iron Works, San Francisco; marine engineer; cable and colonial machinery.

(56) Drop presses.

(57) Steam shovels, dredges and railway machinery.

(58) Railway manager.

(59) Expert in testing and inspection; diamond cutting tools; designer of extensometers and testing machines.

(60) Engine builder; professor of engineering.

(61) Expert and editor.

(62) Gas and refrigerating machinery; thermodynamist.

(63) Steel works manager.

(64) Consulting engineer; mill expert.

(65) Railway motive power superintendent.

(66) Engineer of refrigeration plant.

(67) Maker of optical glass and telescope lenses; fine machinery for scientific apparatus; educator, physicist, astronomer.

(68) Naval engine builder, U. S. Navy engineer, shop administrator.

(71) Engineer for shipyards.

(72) Engineer, Continental Iron Works, gas machinery.

(73) Railway engineer; Colonial machinery.

(74) Consulting engineer.

(76) Manufacturer agricultural machinery.

(77) Engineer for iron production.

(79) Ex-naval engineer, designer and expert.

(80) Engine and power plant designer; specialist in compound engines for mills.

(83) Engine designer and builder.

(84) Steam pumps.

(85) Steam pumps.

(86) Steel pipe engineer; manufacturer of explosives.

(87) Technical newspaper editor; locomotive expert.

(88) Printing presses; consulting engineer.

(89) Expert and engineer, motor vehicles.
(90) Expert in tests; consulting engineer.
(92) Power plant designer, engineer and manager.
(94) Power plant engineer.
(95) Consulting engineer.
(96) Engineer and manufacturer.
(97) Manufacturer, expert in rapid manufacture.
(98) Electrical engineer and works manager.
(100) Superintendent of railway motive power.
(101) Engineer and manufacturer.
(102) Electrical railway engineer.
(103) Engineer, of firm Woodmansee and Davidson.
(104) Manufacturer of ball bearings. Donor of the Henry Hess fund for prizes for best papers.
(105) Power plant engineer; engineer for the general manager, New York Edison Company.
(106) Consulting civil engineer. One of Panama Canal Commission. Tunnels and canalization of rivers.
(107) Motor vehicle manufacturer. General manager, Cadillac Motor Company.
(108) General consulting electrical engineer.
(109) Professor mechanical engineering, Rensselaer Polytechnic, Troy; author.
(110) Power plant engineer, Union Electric Light and Power Company.
(111) Factory manager.
(112) Consulting engineer, mill power plants.
(113) Engineer and designer, hoisting and conveying machinery.
(114) Railway superintendent of motive power.
(115) Director of Public Works, City of Philadelphia. Expert in scientific management.

Of the persons who have served the Society as Treasurers and Secretaries, it may be said that the Society is fortunate in having had a limited number of each. The list is as follows:

TREASURERS

Lycurgus B. Moore...............	April, 1880—December, 1881
Charles W. Copeland.........	December, 1881—November, 1884
William H. Wiley.....................	November, 1884—date.

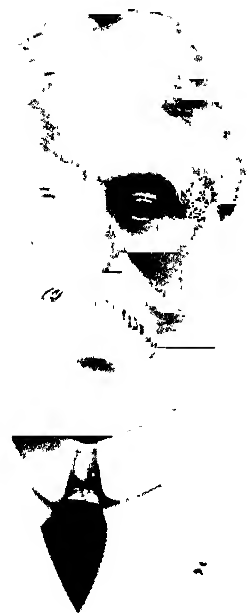
SECRETARIES

Saml. S. Webber, Jr.	Secy. organization meeting, 1880
Lycurgus B. Moore	Acting Secretary, April—November, 1880
Thos. Whiteside Rae	November, 1880—March, 1883
F. R. Hutton	1883-1906
Calvin W. Rice	1906-date

Mr. Moore had had a commercial and business training and when asked to be custodian of dues and other income at the origin of the Society, he was acting as treasurer for the American Machinist Company. He acted also as Secretary for several months while Mr. Holley and Dr. Thurston were really operating the details other than clerical. After his re-election in 1881 to the office as Treasurer by formal vote of the Society, he insisted on declining to serve, on a principle that his official relation to a technical journal was a bar to the best lines of development of the Society, because his relation to journalism would be an occasion for jealousy.

Mr. Copeland was a marine engineer and although without specific commercial or financial training, his age and sterling character made him a wise selection. The routine of bookkeeping was done for him by his capable clerk, Mr. Morison, who did all the detailed work. The early members' ledgers are in the handwriting of the latter. His office was in 32 Park Place, one flight up. As has been elsewhere mentioned, it did not commend itself that the Society should be employing a Treasurer's clerk to do work which could be better done in the Secretary's office, so that Mr. Copeland was nominated for the Vice-Presidency and a new Treasurer was sought in 1884. Major Wm. H. Wiley as Chairman of the Finance Committee had been active in urging the economy due to a transfer of the duties of collecting and accounting to the office of the Secretary, and was therefore unable to hold out against the pressure to "take his own medicine" and become Treasurer under the policy which he had advocated and to make it a success.

Major William H. Wiley was a graduate of the Rensselaer Polytechnic Institute at Troy. He went first into



Wm H Wiley

TREASURER

OF

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

ilroading in Ohio, but later at the request of his father, e late John Wiley, he returned to New York to develop e department of scientific and engineering textbook ıblishing which was then to be undertaken. The techcal affiliations and interests of such a position, coupled ith its commercial requirements, have made Major 'iley an ideal Treasurer and he has been renominated ıd elected to succeed himself for nearly thirty years. e has his military title from service as a mere lad as ficer of an artillery regiment in the War of the Reellion; and has twice been sent as representative of the tate of New Jersey to the United States Congress.

The Treasurer of the Society is the key to its treasury, which only opens on his signature upon a Society check. Such disbursements in detail to individual creditors as nay be required are made by a cashier whom the Treasurer keeps in funds by a single large check at inervals; and all disbursements by the cashier must be on pproved vouchers, certified as satisfactory by the Finance Committee through its Chairman. The Comnittee again look to the Secretary and to the Standing Committees for their approval of such vouchers and the visdom of the expenditure demanded; while the Council s trustees over all the interests control appropriations) the committees in their annual budget.

Samuel S. Webber, who was the first recorded Secreıry, was the young son of Mr. Samuel Webber, even ıen a veteran in New England, and a specialist in waterheel engineering and the turbine. He was chosen as burden bearer for that meeting by reason of his lusty outh, but no filed records are extant, and he did no 'ork after the meeting.

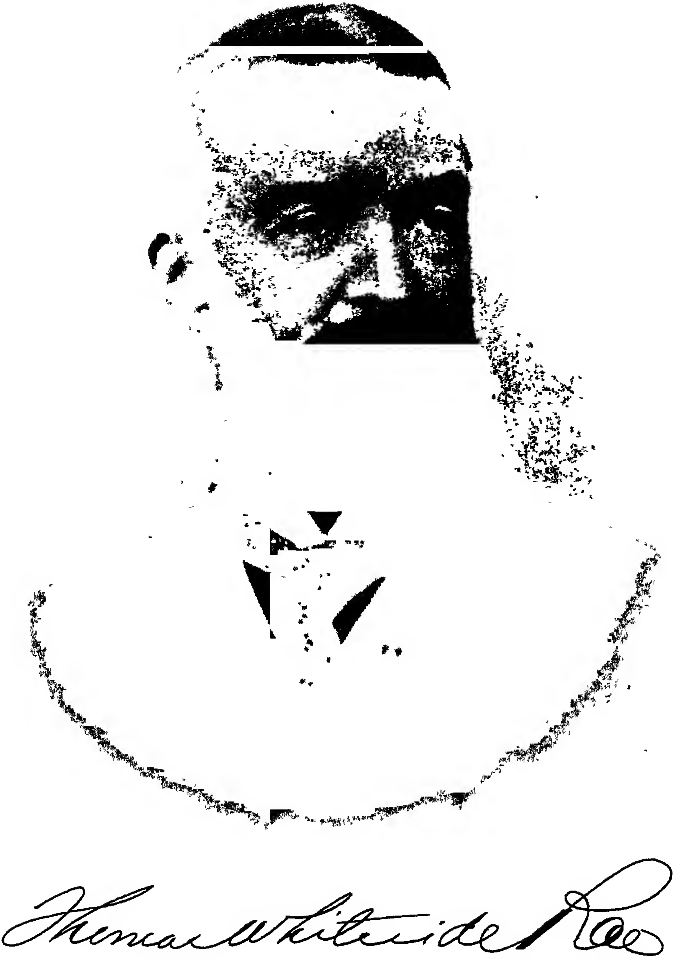
At the ratification meeting in April at which the Rules were adopted and the officers elected, *Mr. James C. Bayles* acted as Secretary of the meeting and of the Soiety. He was then the editor of *Iron Age* and wielded a acile pen. Later he became Health Commissioner of he City of New York, at the urgent request of Mayor Abram S. Hewitt, and after his term expired identified

himself with an enterprise for the manufacture of spirally welded pipe in long units. But the problem of the joints had not been worked out at that time and both Mr. Bayles and the many friends enlisted with him were heavy losers. He had a charming personality, and was a clever and witty speaker.

Mr. Moore acted as Secretary as well as Treasurer until *Mr. Thomas Whiteside Rae,* Mr. Worthington's son-in-law, was appointed Secretary in the fall of 1880, before the first meeting for papers. He was an ex-naval engineer with special experience in submarine telegraph cable work, and his office was at 239 Broadway. He served as Secretary in the three New York Meetings of 1880, 1881 and 1882, and the Hartford and Altoona Meetings. He served until his successor was elected and accepted on March 1, 1883.

Prof. Frederick Remsen Hutton was Junior Professor of Mechanical Engineering in Columbia University. He was thirty years old. The Society could not afford an office, so he rented one for himself. His first volunteer assistant was his brother, Dr. Allan C. Hutton, and later Mr. Charles G. Strang was engaged at a salary which the Secretary for some time paid out of his own compensation of $1000 per annum. Mr. Strang after about a year was succeeded by Mr. Harry L. Dessar (with a summer interval with Mr. Louis Gross) and then Mr. John H. Allen began his long service, just after the office had been moved to the Stewart Building at 280 Broadway. Mr. Allen served until 1891 when he was succeeded by Mr. Francis W. Hoadley who was well and favorably known to so many of the members and who served until after the move to the Engineering Building in 1906-1907.

The earlier secretaries before Mr. Rae were in reality recording secretaries and not executives. With Mr. Rae began the system of making the Secretary the executive officer of the Society as well as its recorder and clerk. This grew under the incumbency of his successor, until the Secretary by long tenure and wide acquaintance be-



SECRETARY 1880–1883

OF

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

ıme not only the executive of the legislation of the ouncil, but also, and perhaps more emphatically, the ıitiating intelligence, preparing and digesting material › be submitted to the Council and taking original action, hich the Council should afterward make its own when should approve. This philosophy had some advantages ı the days of small things and made for speed and ficiency. As the Society grew in numbers and in the ›ope of its activities, this earlier plan was seen by the ›resighted to be compassed with the dangers of limiting ıch activity of the Society to the capacity of its Secre-.ry; and with his full concurrence and support the ıilosophy of control and management by standing com-ittees under the Council was substituted for the earlier ›licy in 1904 (See Chapter V.) The Secretary was ›cretary of each committee and so in touch for sugges-ons and recommendations as before, and in a place of ‹ecutive authority after the deliberations of the com-ittees had formulated a policy. This is the plan in ›eration at this writing.

Professor Hutton had written a monograph on Ma-ıine Tools for the census of 1880, now an historic assic of its date, and two textbooks, on Mechanical ngineering of Power Plants and on the Gas Engine. 'hile in office he did a limited amount of expert and con-ılting practice only, by reason of the full occupation of s time in his professional work at Columbia and as ›an of its Engineering Faculty and in the work of the ›ciety. He was editor for encyclopedias and diction-'ies, notably the Century edition of 1911. He was con-ılting mechanical engineer for the Department of 'ater, Gas and Electricity for a year after completing s service to the Society; consulting engineer for the utomobile Club of America, and in a general office 'actice. On the completion of his twenty-four years, e Society presented to Professor Hutton a gold tablet edal, inscribed:

PRESENTED BY
THE COUNCIL OF

THE AMERICAN SOCIETY
OF
MECHANICAL ENGINEERS

TO

FREDERICK REMSEN HUTTON
E.M., PH.D., SC.D.

IN GRATEFUL APPRECIATION OF WISE COUNSEL, UNTIRING INDUSTRY AND LOYAL DEVOTION AS SECRETARY FOR TWENTY-FOUR YEARS

1883-1907

Professor Hutton was elected Honorary Secretary in 1907.

The fifth Secretary is Mr. Calvin Winsor Rice, elected in 1906 and still in office. Mr. Rice was a graduate with the Class of 1890 from the Massachusetts Institute of Technology. He served progressively in all departments of the General Electric Company, including manufacturing, designing, office engineering, supervision of construction and operation in the field. He had also served as vice-president and general manager of one of the Westinghouse companies and at the time he was invited to become Secretary he was engineer in the New York office of the General Electric Company. Previous to becoming Secretary, he was always an active worker in organizations, serving in one of the other national engineering societies consecutively as member of the Finance Committee, Chairman of the Meetings and Papers Committee, Chairman of the Sections Committee and Chairman of the Building Committee; and in this Society he had served as Chairman of the Meetings Committee. The history of his administration will be written by other and later hands.

Calvin W. Rice

SECRETARY

OF

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

CHAPTER VIII

Some Early Members of the Society—Honorary Members

In the brief summary of the previous chapters the claims for remembrance have been mentioned in the case of those who have borne office. But there were many others in the early roster who served the Society on its laborious committees or who never came on the roll of its officers, yet who are more than deserving of similar recognition in a historical review. The Honorary Members also who have passed away should be included in any effort to show how greatly their association with the Society has strengthened and distinguished it.

Honorary Membership in the Society was at first restricted to men who had virtually retired from active practice. This was later seen to impose unnecessary restrictions and to keep from the Society and from eligible persons the mutual advantage of this pleasant relation. The list has been restricted to twenty-five so that it should be conferred only in cases of distinguished achievement or noteworthy service, and given to men of really exceptional position and reputation.

The list of Honorary Members no longer living includes the following:

	NAME	DATE OF ELECTION	DIED
(1)	Horatio Allen	1880	1889
(2)	Daniel K. Clark	November, 1882	1896
(3)	Rudolph Clausius	November, 1882	1888
(4)	Peter Cooper	November, 1882	1883
(5)	O. Hallauer	November, 1882	1883
(6)	G. A. Hirn	November, 1882	1890
(7)	Edward J. Reed	November, 1882	1906
(8)	Franz Reuleaux	November, 1882	1905
(9)	Henri Schneider	November, 1882	1898
(10)	C. William Siemens	November, 1882	1883
(11)	Henri Tresca	November, 1882	1885

(12)	Johann Bauschinger	November,	1882	1893
(13)	Frederick Bramwell	November,	1884	1904
(14)	F. Grashof	November,	1884	1893
(15)	Gustav Herrmann	November,	1884	1907
(16)	Benjamin Baker	May,	1886	1907
(17)	James Dredge	May,	1886	1906
(18)	Francis A. Walker	May,	1886	1897
(19)	V. Dwelshauvers-Dery		1886	1913
(20)	John Coode	November,	1889	1892
(21)	Joseph Hirsch	November,	1889	1901
(22)	Chas T. Porter	January,	1890	1910
(23)	Henry Bessemer	June,	1891	1898
(24)	William Arrol		1895	1913
(25)	John Fritz		1900	1913
(26)	Gustav Canet	December,	1900	1908
(27)	William H. White		1900	1913
(28)	Chas. H. Haswell	April,	1905	1907
(29)	George W. Melville	February,	1910	1912
(30)	Carl Gustav Patrick de Laval		1912	1913
(31)	Rudolph Diesel		1912	1913
(32)	George Westinghouse		1897	1914

A man to be elected to Honorary Membership will usually have a long life behind him to justify his honor. Death has therefore a longer list than that of the active living men.

(1) Ran the first imported service locomotive in America in 1830, a Stephenson engine operated at Honesdale, Pa. Later he was president of the Novelty Iron Works in New York, building steam vessels and other machinery, up to and during the war of 1861-1865.

(2) English railway engineer, author and experimenter. Clark's tables was a classic of its day.

(3) German author and teacher. Developer of modern theory of thermodynamics.

(4) American manufacturer and philanthropist. Iron master with Abram S. Hewitt. Glue manufacturer. Founder of Cooper Union in New York for education of apprentices and the general public.

(5) Swiss experimenter, engineer and author.

(6) Alsatian engineer, experimenter and constructor; first applied wire rope at high speed for long drives.

(7) English marine engineer and ship designer.

(8) Educator and mathematician. Founder of the

Royal High School at Charlottenberg. Author of Kinematics of Machinery and The Constructor.

(9) Iron master, designer of furnaces and forge machinery, ship and engine builder of France. Significant name in history of steel making.

(10) Metallurgist and electrical engineer, Berlin and England; designer of regenerative principle for perheating gas for furnaces.

(11) French engineer, experimenter and author.

(12) German educator and author on Machine Design.

(13) British consulting engineer.

(14) German educator and author.

(15) German educator and author.

(16) Consulting engineer; built the Assouan Dam and the Forth Bridge.

(17) Editor of *London Engineering,* author and writer; very active in bringing about the first trans-Atlantic visit of 1889.

(18) Economist and author; head of tenth census, the greatest industrial census up to that time; president, Massachusetts Institute of Technology.

(19) Belgian educator, experimenter and author.

(20) British consulting engineer for colonial work; president Institution of Civil Engineers when A. S. M. E. visited England in 1889.

(21) French engineer and writer.

(22) Designer of first high-speed steam engines and of Porter isochronous governor.

(23) British metallurgist; inventor of steel process in England at about the same time that Kelly brought out his pneumatic process for the removal of carbon and silicon from a bath of melted pig-iron.

(24) Builder of Forth and other great British bridges for railways; Tower bridge of London.

(25) Creator of Bethlehem steel and iron plant, armor and mandrel forging plant, harveying plant, later consulting engineer.

(26) French engineer and manufacturer.

(27) English marine consulting engineer and de-

signer both for navy and trans-Atlantic marine. Designed Lusitania and Mauretania and other turbine driven vessels of great size and speed. Received Fritz medal.

(28) First Engineer-in-Chief of U. S. Navy, introduced steam for propulsion; author of first engineer's pocketbook.

(29) Engineer of United States Navy in the relief expedition for De Long and the Jeannette. Engineer-in-Chief during war of 1898 with Spain. Introduced marine repair ship to avoid return of squadron to a repair base. Introduced distilling ships; fostered triple-screw propulsion and water-tube boilers.

(30) Swedish inventor of steam turbines with high speed of motor used directly in centrifugal separators and with herringbone reduction gears for general purposes.

(31) Designer of internal-combustion motors with high compression of air only and an injection of liquid fuel into the highly heated air. Lost at sea.

(32) Designer of compressed air train brake and signal system; designer of electrical power-generating apparatus; manufacturer and consulting engineer.

The active list of living Honorary Members at the time of preparing this chapter includes the following persons:

(33) Gustav Eiffel 1886
(34) Henri Leaute 1891
(35) Benj. F. Isherwood 1894
(36) Wm. Cawthorne Unwin 1898
(37) Sir Douglas Fox 1900
(38) John E. Sweet 1904
(39) Thos. Alva Edison 1904
(40) Andrew Carnegie 1907
(41) John A. Brashear 1908
(42) John A. F. Aspinall 1911
(43) Anatole Mallet 1912
(44) Oskar von Miller 1912
(45) Charles H. Manning 1913
(46) Alfred Fernandez Yarrow 1914
(47) Erasmus D. Leavitt 1915

(33) French designer of steel work bridges and

C. E. Billings

PRESIDENT 1895

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ıducts; projector and designer of the tower which ırs his name.

(34) French consulting engineer.

(35) Engineer-in-Chief, United States Navy, during ; war of 1861-1865; experimenter and author.

(36) British educator, author and engineer.

(37) British iron master, bridge and machinery ilder.

(38) Educator at Cornell University and director of ıcational shops; engine builder and designer, manufac- ·er, past-president of the Society.

(39) Inventor and electrical engineer, designer of hting system, telegraph systems, phonograph, cine- ıtograph and combinations.

(40) Iron master and philanthropist; donor of engi- ɜring building for the engineering societies.

(41) Manufacturer, educator, astronomer, physicist. ıker of telescope lenses and diffraction gratings.

(42) British railway president. President, Institute Mechanical Engineers, 1910.

(43) French designer of locomotives for very heavy ıffic and curved alignment.

(44) German consulting engineer; head of Munich ıseum of historical technology, mechanics and in- stry.

(45) Ex-naval engineer and instructor. Power plant d textile mill engineer.

(46) Designer of yacht and boat engines and par- ularly of high-pressure sectional marine boilers, ›tor-vehicles and general engineering products.

(47) Designer of steam engines of high economy for mping mine-hoisting waterworks and sewage disposal. nsulting engineer for Calumet and Hecla Mining Com- ny.

To the above lists should be added the names of A. L. ›lley and Henry R. Worthington, Founders of the So- ›ty. Mr. Holley was a steel works designer, engineer d administrator. Mr. Worthington was a hydraulic gineer, designer of pumps having no flywheel and the

great duplex engines for waterworks and for all services.

The list of early members who died without the distinction of office or honorary membership would include:

Erastus W. Smith, who did much distinguished work in paddle-wheel vessels for Sound and River practice with beam engines.

Henry H. Gorringe who brought the obelisk from Egypt for erection in Central Park, New York, devising machinery for tilting and lowering the massive monolith without shock and getting it into the hull of the vessel of transportation by cutting a hole in the bow. It was also carried across the city and erected in place on arrival.

D. S. Hines was an associate of H. R. Worthington and responsible for much mechanical detail.

Emile Loiseau was influential in the experiments to utilize culm.

John B. Root designed and constructed a type of sectional water tube boiler.

Jackson Bailey was the first editor and one of the founders of the *American Machinist.*

Cornelius H. Delamater was the owner and principal director of the Iron Works in New York City which built much of Ericsson's machinery for vessels, including the engines of the Monitor, and for his hot-air engines. He was an important figure during the war of 1861-1865.

John Ericsson designed the trans-Atlantic vessel operated by hot air instead of steam gas, and designed the Monitor and its engines, and afterward experimented with motors to utilize the radiated heat from the sun.

Harvey F. Gaskill, designer of original waterworks pumping engines in use in the Middle West.

William R. Jones, the great steel works manager, who lost his life in a blast furnace accident, taking a risk himself which he would not allow a subordinate to take.

Alfred C. Hobbs, who picked the best English locks for an offered prize in 1851 and later developed American locks before the Yale period and that of the time-lock.

Stephen Wilcox, designer of early hot air engines, and later with George H. Babcock the developer of a sectional water-tube boiler.

A. M. Wellington, a technical journalist and author, designer of a series heat engine to operate on liquids of differing volatilities, and leaving behind him a monumental work on the Economic Location of Railways.

Joshua Rose, writer on shop practice.

James Francis, hydraulic engineer for mills and waterworks practice, designer of a turbine waterwheel, and originator of the accepted formula for flow over weirs.

Alfred E. Hunt, identified with early commercial production of aluminum for use in the arts.

George H. Norman, building waterworks for municipalities and operating them as private corporations. He originated and used the cement covered and lined pipe.

A. C. Rand, founder of a rock drill and air compressor industry.

John F. Allen who coöperated with Charles T. Porter in the bringing out of an engine of high rotative speed, contributing the basic ideas of the valve gearing.

Jerome Wheelock, builder of steam engines and designer of a special type of valve and gear.

Bryan Donkin, English expert, gas engine and steam power.

J. M. Allen, founder of the business of boiler insurance on the basis of careful inspection by experts.

Clark Fisher, designer of joints for railway rails.

Robert Hoe at the head of the printing press manufactory bearing his name.

Walter C. Kerr who developed the concept that a contractor supply the consulting engineering ability required on the contracts which he undertakes, and who carried his principle to a successful issue in the great terminals at Boston and for the Pennsylvania Railroad in New York.

It must not be inferred that the foregoing references exhaust the list of names eminent in the profession who

have been connected with the Society and are no longer living. Nor does the omission of living persons imply that such are not more worthy of record than many so listed. But the chapter is one concerning the history of the Society and not that of the individual and the limits of available space must be recognized in any effort to cover the ground which would be possible where these would not be felt. It is, however, an effort to keep alive the early traditions of the Society, and to preserve on the record the names of some who have distinguished its early years.

John Fritz

HONORARY MEMBER
PRESIDENT 1896
OF
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

CHAPTER IX

Some Notable Papers Read Before the Society

A paper may be presented before an engineering society and for publication in its Transactions from a variety of motives:

(*a*) The author may have something to say or record for the benefit of the profession; there may be a research or a test or a discovery which he desires to share.

(*b*) The author may be urged by the Society for its reputation to select its public meeting as a place to present a paper by him and its Transactions as a place for its record.

(*c*) The author may have something which will be a benefit to him and to his reputation to publish.

Papers of the highest grade will benefit all three parties: the individual, the Society, the profession and the world at large. Papers of the lowest grade must have some factor of the upper two classes to make them acceptable to a committee on papers and publication. Hence, in any list of papers running through the years, it will only be papers of the two first classes which will be notable; and differences of opinion are most easy and possible according to the point of view of the observer. Papers once notable are perhaps so no longer from the very lapse of time. With this explanation, attention may be called in a history of the Society to the following:

A. L. Holley (Vol. 1, No. 2), Field of Mechanical Engineering, as an early study of the fundamental character of the work of the mechanical engineer in all the collateral subdivisions of engineering as a whole.

Coleman Sellers (Vol. 1, No. 4), The Metric System.

covering the objections to the unit of length which it imposes, in the processes of manufacture.

John E. Sweet (Vol 1, No. 11), Friction as a factor in Motive Power Expenses, and particularly the loss of power in packings and in poor alignment of engines.

John C. Hoadley (Vol. 1, No. 12), High Ratios of Expansion and the difficulties of crankpin effort with high pressure and early cut-off in simple engines.

Charles E. Emery (Vol. 2, No. 21), Experiments with Non-Conductors of Heat; the first of a long series of such researches, and not yet out of date.

E. D. Leavitt, Jr. (Vol. 2, No. 30), the Superior, a type of massive mine engine, where high operating economy was of more consequence than the first cost.

Wolff-Denton (Vol 2, Nos. 32 to 35), Theoretical Study of the Most Economical Point of Cut-off, steam economy not being the only factor considered.

C. J. H. Woodbury (Vol. 2, No. 52), Mill Floors, a first presentation of the philosophy of the slow burning construction.

Edison-Porter (Vol. 3, No. 71), Edison Steam Dynamo, a description of a direct-coupled unit, in which the engine was to meet the high speed of the dynamo of that time, and not the dynamo kept to the best speed for the engine.

Gaetano Lanza (Vol. 4, No. 94), Tests on Spruce Beams, a series of tests of full size members, then something of a novelty, and a check on the usual formulae and constants.

W. E. Ward (Vol. 4, No. 126), Béton in Combination with Iron, a description of a reinforced-concrete residence, probably then the first of its kind in the country.

John M. Ordway (Vol. 5, Nos. 135, 145), More Tests on Effectiveness of Non-conducting Coverings.

W. A. Rogers (Vol. 5, No. 146), A solution of the Problem of Making a Perfect Screw for Feed Purposes in dividing engines or for ruling diffraction gratings.

W. F. Durfee (Vol. 6, No. 154), The Experimental

Steel Works at Wyandotte, where steel was made by the Kelley pneumatic process in anticipation of Bessemer.

A. C. Hobbs (Vol. 6, No. 167), Locks and their Failure, including an account of the picking of the best English locks of 1851.

John T. Henthorn (Vol. 6, No. 174), Friction of Shafting in Mills, a diagram of results of tests.

J. C. Hoadley (Vol. 6, No. 183), Trials of a Warm-Blast Apparatus, preheating furnace air from waste heat.

Wilfred Lewis (Vol. 7, No. 198), Transmission of Power by Gearing and (Vol. 7, No. 223) by Belting.

Henry R. Towne (Vol. 7, No. 207), The Engineer or an Economist, and (Vol. 10, No. 341) Gain Sharing: the first and second papers of many to show the outlook of the mechanical engineer as a works manager and employer of men on the problems of distribution of profits of production.

Charles E. Emery (Vol. 10, No. 319), Cost of Power in Non-Condensing Steam Engines.

F. A. Halsey, the Premium Plan of Paying for Labor (Vol. 12, No. 449), a notable paper which exerted an important influence on labor matters in machinery building establishments in this country and abroad.

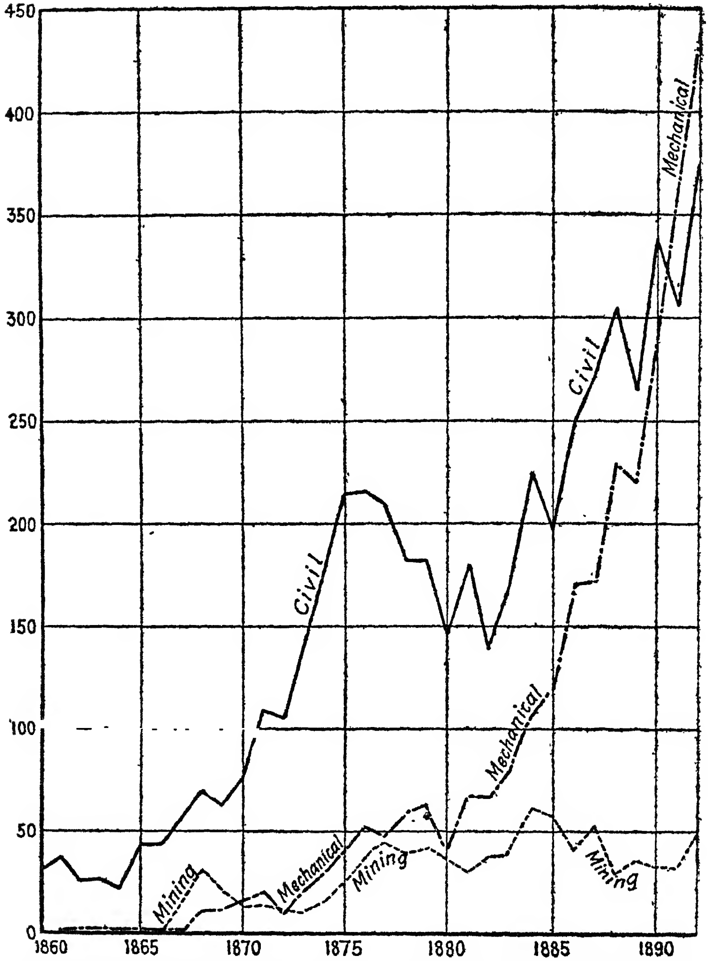
Robert H. Thurston (Vol. 14, No. 543), Technical Education in the United States: a review of the history of education under the Land Grant Act of 1862. An illustration from that paper, shown on the next page, is an interesting and serviceable record taken therefrom.

W. F. Durfee (Vol. 14, No. 549), The History of the Art of Interchangeable Construction in Mechanism.

F. W. Taylor (Vol. 15, No. 568), Notes on Belting, an exhaustive investigation as to belt tensions best suited to get the most satisfactory results in transmission in length of life and consequent costs.

Gaetano Lanza (Vol. 16, No. 609), Tests of the Strength of Spruce Columns, another record of tests of full size units in continuation of No. 94.

Charles T. Porter (Vol. 16, Nos. 615 to 618), Papers



GRADUATES FROM ENGINEERING SCHOOLS IN THE UNITED STATES SINCE 1860

on an Engine Design, his latest achievement in his chosen field.

Fred. W. Taylor (Vol. 16, No. 647), A Piece-Rate System.

W. J. Keep (Vol. 16, Nos. 655, 656), Transverse Strength of Cast Iron, and Study of Molecular Changes in Metals by varying temperature. Mr. Keep had other papers in this field.

Walter C. Kerr (Vol. 21, No. 845), The Mechanical Equipment of the New South Station, Boston, Mass. A presentation of his philosophy of having the contractor act as consulting engineer and work to his own specifications in detail, guaranteeing satisfaction to the owner.

Milton P. Higgins (Vol. 21, No. 864), Education of Machinists, Foremen and Mechanical Engineers. A presentation of his plan of half-time schools where boys should learn a trade while acquiring a common school training.

C. E. Sargent (Vol. 22, No. 879), A New Principle in Gas Engine Design. First advocacy of governing by control of admission of mixture.

Henry L. Gantt (Vol. 23, No. 928), A Bonus System of Rewarding Labor. This was one of the most distinguished series including Taylor, Halsey, Dodge, Emerson, Towne and others on the best plan to improve the efficiency of the human factors in production, and to reduce such cost.

Frederick A. Halsey (Vol. 12, No. 449), The Premium Plan of Paying for Labor; (Vol. 24, No. 971), The Metric System. A presentation of the arguments against the convenience and practicability of the metric unit of length in the processes of industry.

Rogers Birnie (Vol. 25, No. 1027), Ordnance for the Land Service. A plea for the quality of mechanical engineering exacted by the ordnance requirements in the United States army.

This list, which makes no pretense to be more than an individual's comments and which others would supplement by other papers having a different view-

point, may well be concluded by the monumental paper by Fred. W. Taylor on the Art of Cutting Metals, his presidential address, published in Volume 28 and issued separately in book form, to which reference has already been made elsewhere. It incorporates studies, tests and experiments extending over many years, and recorded with a painstaking accuracy and completeness which make them a model. As science and civilization advance, the opportunities for epoch-making discoveries and their presentation at first hand before scientific societies, grew fewer and fewer. More and more the commercial significance of discoveries and inventions drew these into publicity through other channels, and the papers which embody their scientific basis appear more as discussion of detail, after the fact or material or process has become public property or the investment of the capitalist.

CHAPTER X

Internal or Office Activities of the Society for the Benefit of Members

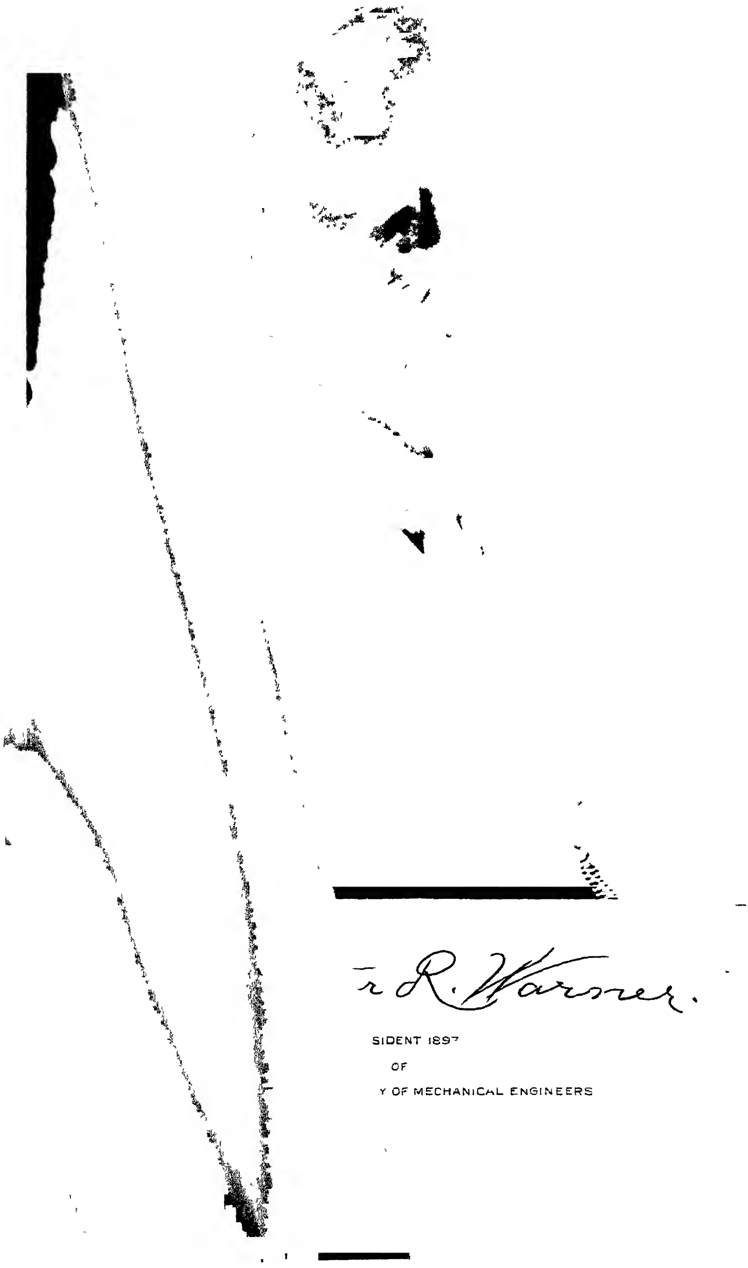
An engineering society such as The American Society of Mechanical Engineers has or may have a number of functions. It may exist to bring together the representatives of the profession, that it may act as a unit on questions referred to such an association, or on matters of common and universal interest. It may exist as a channel of publication and distribution of papers and discussions on topics of moment to such profession and as a hall of records, for data, discovery, invention and research. It may serve the convenience and advantage of the members in ways not open to those who are not members.

Other chapters have treated of the functional activities of the Society and of its officers relative to the publication and professional record side of its work. The work of a committee on papers and publication, the preparation of the professional program for meetings, the procuring of papers and of qualified participants in debate and contributors to the discussions, the selection of topics and the whole editorial labor as respects the Society Journal and volumes of Transactions, the indexing and the great scope of the field of abstracting, translating and comment on matter outside of the literary and publication activity of the Society itself, form a very large fraction of that labor expenditure which is made possible by an association of many persons paying dues to that end. The fact of the publication and the existence of the records in Transactions is a large part of the contribution which the Society makes to the profession as a whole and to its contemporary civilization.

But the return to the members themselves outside and beyond this return which they share with others is a very important part of the significance of their membership. Such return comes to them mainly through the activities of the office of the Secretary and is conditioned and limited only by his abilities and energy.

There may be placed first in this list, the duty and procedure of candidacy for new members. The Society will be valuable or valueless according as the quality of its membership is lofty or insignificant. While it is true that in a true democracy all men are equal before the law, opportunity is not open equally to all, nor are all men equal when it comes to making delivery of the goods desired in the market and for which it will pay in legal tender or in the imponderable units of reputation and fame. Membership in the Society should be a sort of "cachet" or patent of nobility in the profession; and a large share of office routine and personnel must be allotted to this department. Nor can it be unintelligent or purely clerical labor or routine, for many cases offer peculiarities and differentiations of which account must be taken. The larger the Society grows, the greater the care necessary, because connection with the Society will be desired by the self-seeking for selfish ends of personal advancement; the list of candidates grows cumulatively with the growth in numbers of those qualified to propose members, and the wider and more varied are the standards by which eligibility is decided on.

The accounting or bookkeeping department of a Society is quite a business undertaking of its office. It has not only the straight routine of annual dues of old members and the charging up of the fees and dues of new members, and the keeping straight of changes in grade and corresponding rates of obligation; the Society has also a considerable volume of business each year in sales of its publications, in purchases of material and in the execution of its contracts for printing, illustration, binding and general job-work. Subscribers also begin



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t varying dates to become liable for charges, and ıbscriptions cease and members resign and die.

Printing houses now usually have a wrapping, ad- ressing and mailing department, but in an older day hen the Society did this work itself, it was a period of ;ress and concentration of effort when something was › be mailed or expressed to the entire membership. Ad- ressing machines have greatly simplified this require- ent and reduced chances for error.

Another activity of the Society and of its business fice is the preparation and maintenance of an accurate embership list, such as it publishes in its Year Book. uch a list is of prime necessity for the office itself, as mailing list; but its publication makes the Year Book professional directory of the greatest value to the ractitioner, to the business man and to the numberless epartments of publicity. It takes no small staff to keep right and up to date. At one time, before pressure ıme from other directions, the corrected lists of names rouped alphabetically and territorially were issued vice a year, with proportionate greater inaccuracy for ıe latter part of each half year. The issue of portraits ' the officers of each year and a general improvement in ıe character of the Year Book were both begun under ıe presidency of Mr. Ambrose Swasey.

Another great activity of the Secretary's office is the bor imposed by the active Council and Standing and pecial Committees, for which it acts as clerical staff. he members all benefit by this, both as respects the outine class of work, and the results of initiative in new elds. The local groups of members holding meetings · the professional sections, the Student Branches and ıe Affiliated Societies, all impose additional burdens for hich the membership at large receive the returns. The ublic Relations Committee, which is to take cognizance ' the duty of the mechanical engineer as a citizen and ıblic servant, entails special labor.

Again, the Society can serve both its members and ;hers by bringing together the need of the employer for

special talent and the available possessor of it. This ranges all the way from the need of the corporation for a talented president, down to the draftsman who is in search of detailers. It is done both by personal interview or private correspondence and by publication of lists which go to the members through The Journal or otherwise. No names are used in publication, but parties are designated by numbers for mutual reference until they are brought together. The Society is necessarily careful to assume no responsibility for relations thus effected, beyond the exercise of a selective intelligence which leads to an introduction of the parties to each other; and subsequent exchange of credentials is their affair and on their initiative. The Society has many agreeable and successful coöperations to look back on since the start of this activity as far back as 1886.

Beside these, there will always be a somewhat personal class of communications in the Society mail, where a member desires information or to know how and where to seek it. These may either be undertaken directly by the Secretary, or from his acquaintance with the range of specialization by the members, he may send it to the man best qualified to answer and so bring the parties together in a relation either of courtesy or of professional clientage.

The Society has also been asked to nominate and send members to serve on governmental or on state commissions of experts, and has been active in the movement for conservation of natural resources in which engineers have a profound interest. Coöperative movements involving other engineering bodies have also become features of the Society's work, and there always is a share to be borne of the responsibility for the proper conduct of the great trust imposed by the joint control of the Engineering Societies Building.

The coöperation of the Society in making its library useful to the members was formerly a burden on the Secretary; but under lines of broader policy this is passing more under the direct charge of the general

library and its representative administrative board, of which the Secretary of the Society is one member.

It may be said in general that where it is possible to administer the Society on this basis the Standing Committees should be administrative bodies rather than executive or administrative units. This is the true philosophy of committee management. The unnecessary duplication of work is avoided and its conduct under common standards is best secured when the office of the Secretary carries out the instructions of committees under the general direction of the Secretary of the Society.

It is due to the generous and capable interest of Dr. Frederick W. Taylor, President of the Society in 1905-1906, that its internal organization was so analyzed and developed that it stands in the front rank of capacity for the work within its purview. The following is the scope of the Society's staff:

(*a*) *The Secretary,* whose special activities in addition to general charge of all work are the meetings of the Society and the Council and its relations with the public and other societies.

Under the head of general charge of the activities of the Society may be listed:

(*b*) *The editorial work.* This is in special charge of the editor with the necessary assistants, who number six under the ordinary pressure of routine. This work includes the activities of the Publication Committee in all its departments, the issue of The Journal, the Transactions and the Year Book, and special relations to the work of the advertising in The Journal.

(*c*) *The purely executive duties.* These are under the assistant to the Secretary who oversees, through the membership of his staff, the handling of the committee activities and the general Society business. Specifically this executive work ramifies into five subdivisions:

(*d*) *Accounting.* This is in charge of the Cashier and one assistant having to do with all bookkeeping, the payment of bills which have been approved by the Finance

Committee and have been found in accordance with the appropriations.

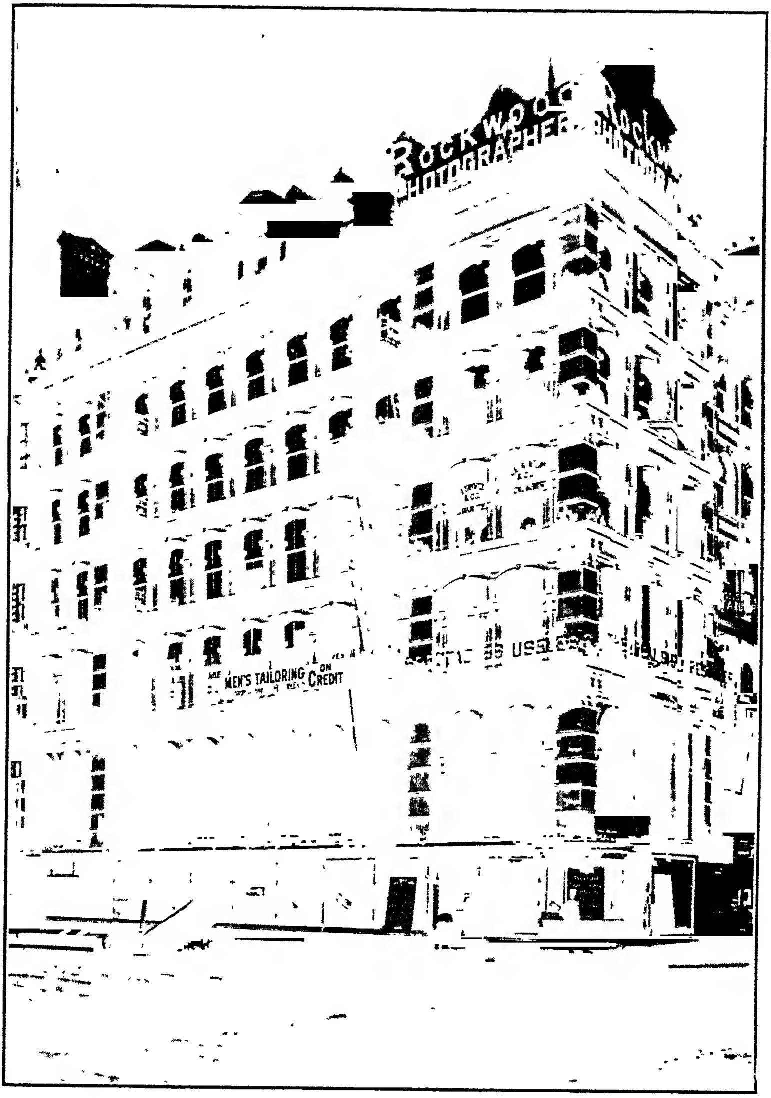
(*e*) *The membership work.* This includes the heavy activities of the Membership Committee as respects all candidates for membership, and in particular the work of the Committee on Increase of Membership which has its own secretary.

(*f*) *The correspondence.* A chief stenographer with the necessary assistants, usually six in number, who is made responsible for the conduct of all stenographic and clerical work of the office in all its various activities.

(*g*) *The purchasing.* The purchasing agent keeps track of all supplies, all orders, and the carrying out of contracts, and must, of course, scrutinize and approve all bills for material.

(*h*) *The mailing and shipping.* This is in charge of a shipping clerk and ordinarily keeps two assistants busy in the work of filling orders, keeping the addressograph up to date with the changes as they are sent in, and cognate work which falls in such a division.

This should make it clear that the operation of an engineering society in full activity with busy committees is a business, and not a side issue of someone else's activity. Its standards, routine and procedure deserve the most careful and exhaustive study and must be such as to be capable of expansion with the growth of the Society. The more busy and active the Society's committees, the greater will be the demand upon the activities of the Secretary's office.



No. 139 Broadway, Office of the Society, 1881-1883

Mott Memorial Library, Fourth Office, 1889-1890

CHAPTER XI

THE HEADQUARTERS OF THE SOCIETY

The Society followed the usual precedents of such anizations at the start in making the headquarters of Society the office of the Secretary for the time being. s made the office of Mr. Lycurgus B. Moore at 96 ton Street, New York City, the first Society address. view of this building shown herewith was taken after American Machinist Company's office had been ved out of the building and it had been somewhat lified in its exterior appearance from what it was at preliminary meeting and during the first year of the iety life.

A photograph is also presented, which shows the Asably Hall of Stevens Institute, Hoboken, N. J., as it eared when the first meeting for organization was vened there. It was later so modified that the photoph is now an antique, but it is interesting as showing at was the foundation area in the first year of the iety's life and identifies Stevens Institute with effec- coöperation in those early days. The Society's lress was still the office of Mr. Moore in Fulton eet until Mr. Thomas Whiteside Rae was appointed retary before the Annual Meeting of 1880. Mr. Rae a son-in-law of Mr. Henry R. Worthington and le his office in the building of the H. R. Worthington npany at 239 Broadway on the site where later the ick Building was erected. The building was of the t-iron and brick construction usual for office buildings hose days and Mr. Rae's office was on the fourth floor. the courtesy of the Worthington Company a store m on the dark side of the building was at the disposal the Society, where the supply of volumes and the

was transacted through this office. Correspondence was in long hand. The view of the Stewart Building is taken from the southwest.

Again, as time advanced, the movement to make the library useful to the members and others had been gaining strength. The idea impressed itself upon the Council that a downtown location in the office area, remote from the hotels of the city, and where the elevator service ceased at six o'clock in the evening, was not favorable to the library idea. It desired to try the experiment of having the library and office opened in the evenings. The visiting member was probably busy in the offices of others during the daytime when visiting from out of town, while in the evening he would be at leisure and would be glad to utilize the time in looking up references and studying transactions of societies of which he was not a member. The Alfred B. Couch bequest of books had also been made and was to be cared for and future growth of the same sort might reasonably be expected.

The catalogue of 1889 shows that the Society had appointed a Committee on a Joint Building for the engineering societies, of which Geo. H. Babcock, W. P. Trowbridge and Henry R. Towne, then President of the Society, were members, but pending any action on the difficult problem referred to this Committee, an investigation was made as to offices north of 23rd Street in New York. Someone suggested that the Trustees of the Mott Memorial Library at 64 Madison Avenue, just above 27th Street, would be willing to share their unused space with a body of kindred aim. The library of the late Dr. Mott had been left with his former residence to house it for the benefit of medicine.

The better facilities of the New York Academy of Medicine in 31st Street prevented the very extensive use of the Mott Library so that it could be condensed and kept available on the second floor of the residence, leaving the ground floor for the use of the engineers. The rooms consisted of the usual front parlor opening from

the hall, a dark middle room, and a rear or dining-room running the whole width of the house with large rear windows. There was also a butler's pantry at the rear end of the hallway. The front room on the street was the business office. The rear room was the Library proper, which was used also as a Council and Committee room and the middle room was made the periodical room. There was no electric light in the building, but a six arm pendant gas chandelier was put in this room, with superheating pipes to the burners, in accordance with the system then so popular in car lighting. A handsome oak table was placed in the center, and oak chairs, with leather upholstering in seat and back, were purchased for furniture. The Secretary loaned an extension table and two sofas. One of the office assistants (John James, the first stenographer) was a person of studious tastes and he was put in charge of the evening uses of the reading rooms, which were kept open until ten o'clock. These quarters were spacious and almost palatial compared with any space available in office buildings within the limit of price which the Society could safely meet. The old office furniture was still kept in service, but a typewriter had been added. There were a few pieces of Mott estate furniture also available.

The Society was so proud of its new surroundings that on the return from the England-France trip of 1889 (Chapter XIV), the opening reception of the Annual Meeting was held in its own Library, which the Society crowded uncomfortably, while the collation was served upstairs. The sessions for papers were held in the auditorium of the Academy of Medicine, 12 West 31st Street on a rental basis (See administration of Henry R. Towne).

In the following winter, 1890, the trustees of the Mott Memorial Library began to feel that they should vivify their undertaking, and therefore they ought to utilize the space which had been leased to the engineers. The Society was in no haste for a change, but was well-satisfied with the experiment of the up-town headquarters and the

evening use which had begun. A strong committee was appointed to look for other and suitable quarters in the city, in an area limited by 23rd Street on the south and 42nd Street on the north and with some relation to the main arteries north and south on Fifth Avenue and Broadway. In the retrospect of the work of that committee even under expert guidance of real estate men the Society visited some house floors in the region designated, whose use after dark would have been impracticable though in daylight feasible enough, but unattractive and sordid.

Visits were carefully made to the former residence of Mr. S. F. B. Morse at 5 West 22nd Street. This was a most attractive location at that time in pleasant surroundings, and it appealed particularly to the electrical engineering interests who were being urged to go into a real estate ownership jointly. It was Mr. Morse who made telegraphy practical in the middle of the century. The study and effort amounted to nothing and it was really fortunate that it did not, because the invasion of business which overflowed 23rd Street would have made the location ultimately undesirable.

Just at this juncture came word to the Secretary that the Academy of Medicine at 12 West 31st Street were contemplating a new and enlarged building for their Library and meetings and that the house they were then occupying would be shortly or was even then in the market. Would it be safe or sane for the Society, having no negotiable assets and no accumulated fund, to dream of going into so large an undertaking as the owning of its own complete house, which at that time it could not fill or even utilize completely for itself? Could it furthermore assume the burden of the payment of interest as rent and the expense of upkeep, taxes, insurance and other overhead charges incident to real estate when its first duty was to publish Transactions and to serve its widespread membership in ways not directly related to a permanent home?

The Council was promptly convened and the daring

C. W. Hunt.

PRESIDENT 1898

OF

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

plan persuasively set before it. Their action was conservative but broad. The Society must be guaranteed that an income from other users of the building paying rent to the Society should make the operating cost but little greater than the Society was then paying for the single floor it occupied. The membership of the Society must raise by subscription the funds necessary to meet the difference between the price of the house and lot and the amount which the owners were willing to leave on mortgage. The detail was left to a committee of which Messrs. J. F. Holloway, Stephen W. Baldwin and F. R. Hutton were the working force. The cash subscription was recognized as the first and immediate difficulty to be overcome, for time was pressing and decision to buy or to let the property pass to other hands had to be early made.

The first step taken was to ask a limited group of the older and wealthier members of the Society if they would become guarantors to meet any deficiency in the subscription list should the Society be unable to meet its contract to pay for the property at the day agreed upon because the subscribing members proved to be slow either in promise or in payment. The second step was to issue to the members a circular in full explanation, asking for subscriptions to a five per cent interest bearing bond, issued for the purpose of securing a New York home for the Society with its attendant advantages. The third step, after these two had shown promise of success, was the creation and incorporation of a Library Corporation to own the real estate and lease to the Society what it and the other tenants were to require. In addition, by its charter it was to conduct a free public library which the charter of the Society did not specially authorize it to do. By this latter procedure and under the law of that date in New York State, a free public library property was exempt from taxation and the question of charter right eliminated. These matters being under way, the active young Institute of Electrical Engineers was asked to come uptown and cast in its lot with its older

sister, taking the third floor of the building or so much of it as it could profitably use. A society of amateur photographers was secured as the occupants of the skylight or top floor and the unlighted basement of the building. They were considered particularly eligible occupants because these two parts of the building were valuable only to a user with such needs. The owners were to agree to fit the basement up with subdivided dark rooms for developing and the top floor with special photographic skylights for portraiture and printing.

There is here a fork in the road, inasmuch as the development of the Society headquarters becomes also the development of the physical housing of the Library. This latter will be treated in detail in Chapter XV, and this chapter will follow the general office and meeting-room side of the problem. Everything worked as desired. The members subscribed for the Society bonds to be issued by the Mechanical Engineers Library Association to the amount of $32,000 and more. The guarantors who had all accepted were not called upon, although many bought bonds upon their issue. The cash payment required on the purchase of the property was to be $27,000, with a first purchase money mortgage of $33,000 left as an investment by the owners, the Academy of Medicine. The $5000 resulting from the bond issue was to be used for the projected alterations, furnishings and refittings. The title passed from the Academy of Medicine to the Mechanical Engineers' Library Association on May 1, 1890.

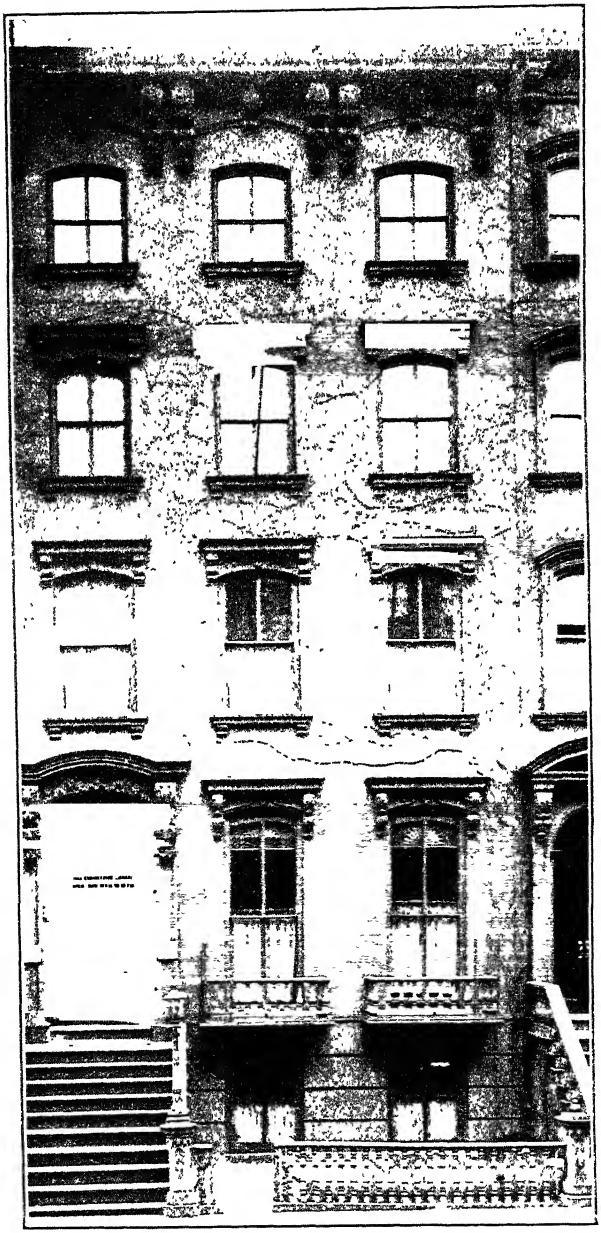
The formation of the Library Association offered some administrative advantages. The members of the Mechanical Engineers were in no way responsible for any acts or obligations of the Library Corporation and yet the former benefited by any successes and good fortune of the latter. The Trustees of the Library Association were Past-Presidents of the Society of Mechanical Engineers and therefore with a community of interests. Both bodies had the same Secretary, but they were

always kept distinct in accounting and in all legal action. The Society of Mechanical Engineers paid rent to the Library Association for the space which it used. The bond holders were members of the Society of Mechanical Engineers and the Library Association paid interest on its bonds to such members. No bonds were held or ever passed in the settling of estates outside of the Society membership. The Society bought the bonds of a deceased member in one case to prevent outside ownership from taking place.

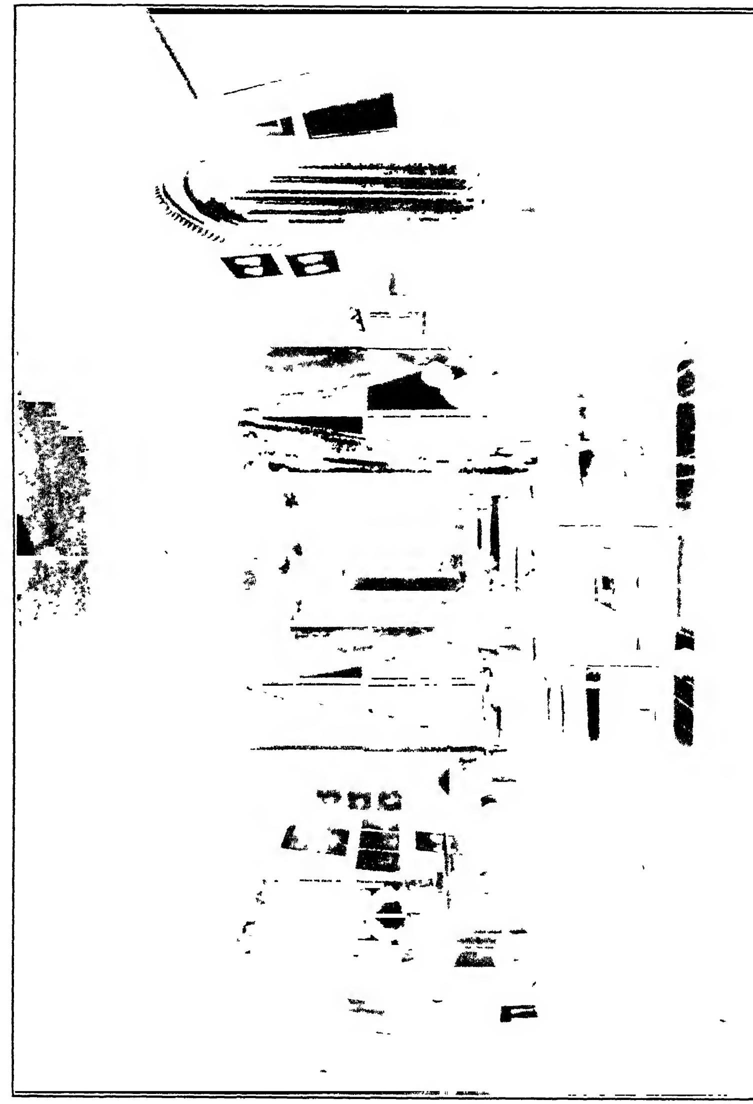
It is of secondary consequence for the above reasons to refer to a lively disagreement with the photographic society, which took place with respect to the terms of the lease. There was no Library Association at the time the lease was to be made, but a joint committee of the Mechanical Engineers and the photographers' society sat to agree upon the terms in detail and what each was to do in the procedure of fitting up their quarters for occupancy. The Committee parted in agreement but when the lease was drawn by the attorneys, embodying these terms in accordance with the Society's understanding, it was objected to by the second party which sought to claim many more changes in fitting up and equipment than the owners had intended to consent to. They refused to sign until these extras not specified in the first agreement had been consented to and incorporated into the lease. The owners' committee had been growing regretful that they had consented to as much as they did in the first agreement. Some of their confidence had perhaps returned to them, so that when the refusal to sign was given by the second party, the first party in effect shrugged its shoulders and said that the deal was off. This "calling of a bluff" did not suit the intending lessees at all and was probably in any case the action of a limited number of persons who may have exerted their authority. They then sought by mandamus and injunction to compel the Library Association to carry out the first agreement. The Library, under advice of

counsel, retorted by refusing entry to the premises
ing the decision before the Court. The Court (.
Lawrence) called attention to the unusual charact
the case and decided that so long as the owner an
intended lessee did not meet in common understa
in the mind of each, there was no lease in existence,
if signed by one party, and the injunction was diss
The Library paid some costs in adjustment and b
from the Society the screen for the auditorium, v
was in accepted use for so many years. The p
graphers signed a release and moved away their ma
which had been sent in before the disagreement arc

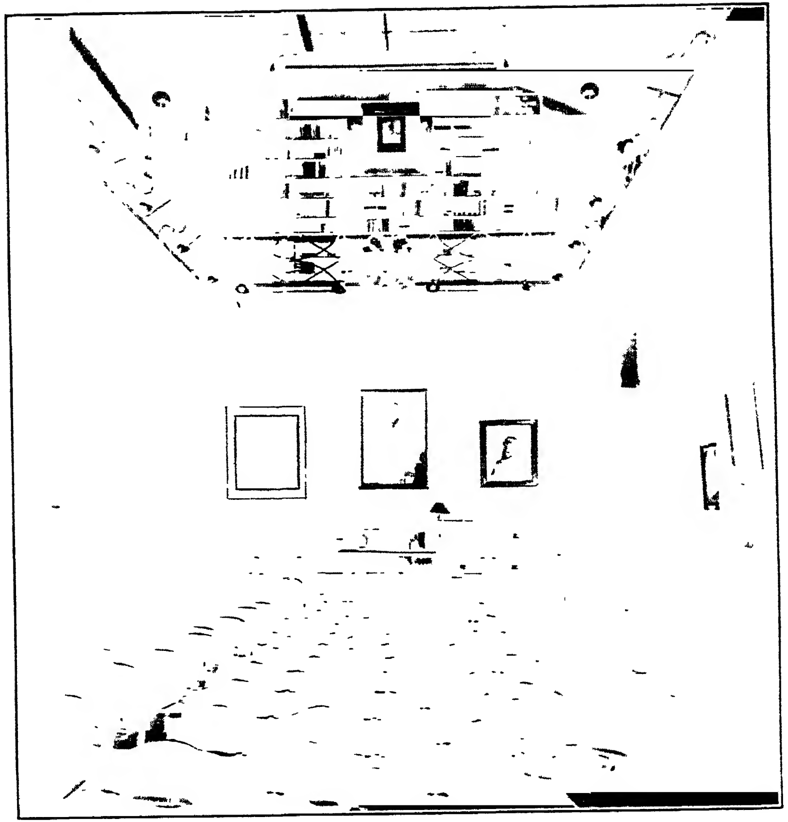
Then arose at once the question of income fro
space thus released. The "burnt child dreade
fire" of uncongenial tenants, but yet the expenses
be met. Two solutions were found. First, the top
and so much of the third floor as the Institute of
trical Engineers were not to use, were attract
furnished as sleeping apartments for the use of men
of the Society coming to the city for a few days
preferred such quarters to those a hotel could fur
This plan was very successful from the start and not
produced a quite steady income but was an eleme
strength for the Society and its growth in member
No meals were served in the house but this offere
difficulty. The other plan was the creation of two f
in the Library Association to which interested men
could subscribe. One was called the Sinking Fund
was aimed specifically at the reduction and payin
of the bonded debt. The other was called the Fellow
Fund and was, in fact, annual dues to the Library f
support. Fellows of the Library had the privile
voting for its Trustees. The auditorium was also
a source of income through rental to societies,
medical and engineering, and to alumni associations
similar bodies. The Institute of Electrical Engi
remained lessees of the Library Association until



The Mechanical Engineers' Library Building, Fifth Office, 12 West 31st Street



Office and Parlor, looking Southwest from Entrance



AUDITORIUM, LOOKING SOUTH

and coöperators in the running of the building. They continued to hold their stated meetings in the auditorium after their return to a downtown location in that year until, as their Society grew in size, it became too small to hold them.

The house at 12 West 31st Street was 28 feet wide by 98 feet deep on its two lower stories. The front of the house was four stories high as shown in the illustration, with a high basement and a deep cellar under all the ower stories. It had a high brown-stone stoop and in the glass over the door was painted the name of the Mechanical Engineers Library. On the solid part of the front door was an aluminum name-plate of The American Society of Mechanical Engineers, which is still in use on one of the inner doorways of the floor devoted to the Society of Mechanical Engineers in the present building. Entering the hallway, large doors opened at the right into a large saloon parlor. This was the business office with the desk of the accountant and the stenographers. This north end of the room, which is shown n the illustration, could be railed off during conventions by a bank railing partition, steadied and supported by an ornamental cast-iron pillar in the middle. The rest of the room was occupied by the handsome oak table which had been bought for a center library table at 64 Madison Avenue, and the Robert Fulton mahogany dining table, the gift of Dr. Egleston, elsewhere referred to. The two rosewood sofas loaned by the Secretary were also in this room. On the walls hung the ornamental oil paintings of a sea scene and a winter landscape which had been bought by subscription the first winter. There were also portraits of Past-Presidents, photographs of Society conventions, and other framed material of historical value. Behind the parlor and separated from t by sliding doors, was the cozy auditorium shown in the illustration, about 40 feet deep by 28 feet wide and two stories in height, with a balcony and library gallery. It held 250 with crowding, and was equipped with cast-

iron and veneered wood folding seats, set together in series of three so as to be removable on occasions. A platform two steps high was at the south end, and the ceiling was pierced by a large ventilating skylight shielded in part by some tinted glass to relieve the glare. In the center of the glass screen in translucent glass was the seal of the Society in colors. On the walls were oil portraits and the model of John Ericsson's Monitor. In one corner was the bust of John Ericsson and near it the Fulton drawings. Over the balcony at the south end and over the platform a screen could be lowered by means of a long roller and supporting cords.

A handsome staircase led up to the second floor which was the Library area. The wall spaces over the large front room and the extension of the gallery over the auditorium were lined with shelves from floor to ceiling. The illustration shows a view looking into the auditorium gallery past the card catalogue cabinet. A portrait of James Watt hung in a niche at the center of the south wall. The library extension table, loaned by the Secretary for use in 64 Madison Avenue, was the library table and the librarian's desk and typewriter was at the front window. Bentwood chairs were at the table. The hall bedroom adjoining the library was the Secretary's office where committees usually met, and was the center of the Society's administrative activity where planning and correspondence were conducted. The Council usually met in the auditorium, which could be made a pleasing, well-ventilated and open space for such gatherings by moving some of the chairs.

A photograph taken two years before the Society moved into its new building shows an interesting gathering of faces noteworthy in Society history. The gathering of Past-Presidents was made possible by the imminence of the New York meeting for that year. Mr. James M. Dodge, President of the Society, is in the chair. In this auditorium also were held most of the later meetings of the Building Committee of the Engineering So-

Past-Presidents at a Council Meeting in Auditorium, 12 West 31st Street

LIBRARY AND GALLERY LOOKING SOUTH, SECOND FLOOR

cieties Building and the early meetings of the Board of Trustees of the United Engineering Society, after it had been formed. Its first meeting was held here after the charter was granted and the Trustees took their preliminary steps under advice of competent counsel.

On the third floor were sleeping rooms and the toilet and bathrooms; on the fourth floor sleeping rooms, bathroom and the janitor's room. Miss Isabelle Thornton, who was house matron and superintendent of the building as well as librarian, was also accommodated on this fourth floor. In the basement was a large space under the auditorium which was used as a banquet or a collation room on occasion and had its walls lined with paste-board boxes containing the Society's pamphlets and papers to meet the calls which were so frequent. The front basement was the mailing and shipping room and was for many years in charge of Clarence W. Robinson. This room was also the coatroom during meetings. Closets in the basement between the front and rear rooms and on the third floor similarly placed were full of supplies of stationery and the supper room equipment of china and glassware. The pine bookshelves of earlier offices were in use in the basement, and during the conventions the front office was utilized as a coatroom. To this end two-inch iron pipe posts with large flanges at the bottom and cross-bars of pipe at the top, supported wooden bars carrying coat hooks. The whole structure could be taken down or put together in a few minutes' time. The basement door into the coat room was narrow and the delay in handling a crowd most annoying. When the banquet room was not in use for collations a second coatroom was opened at one of these doors. The experience gathered in that crowded basement led to one of the most significant and practical expansions which were made possible in the present building, where the coatroom arrangements planned upon the basis of these experiences have been favorably commented upon by all who have had occasion to use them. At the back of the

main hall at the basement stairs were the safe and a water cooler. On the walls and up the main stairs were photographs of the members' achievements in various fields.

The auditorium was such an attractive place, cozy and homelike, with coatroom and collation facilities in such agreeable form, that it was much used by many other bodies. The Society of Heating and Ventilating Engineers and the Society of Naval Architects and Marine Engineers always held their meetings here and many other bodies met occasionally. It had been the policy to secure interest in the Society and its welfare and prominence through as wide a constituency as possible, so that anything which shook or deranged the Mechanical Engineers should vigorously affect many other interests.

It is perhaps difficult at this day and with the present strength, standing and income of the Society, to realize what an enormous step and undertaking the purchase and responsibility for that house were to the modest men of that day. If it had failed, the consequences to the Society would have been most disastrous. Its success was the greatest thing that ever happened to it, up to that time and for many years.

The increase of the dues (Chapter V) was one of the greatest factors in insuring the financial certainty of the movement. All special funds were done away with in the collection of dues, except where otherwise desired for Library uses alone; and the Society entered bravely on its undertaking to redeem its bonds. They had ten years to run, or from 1890 to 1900; and at first some were given or bequeathed; later they were bought in by a transaction in which the Council granted a life membership in the Society to a member who used his bonds as a tender for such purchase; and finally the last ones were bought in for cash before the date of their maturity. The second mortgage on the property of the Library Association, by which these bonds were protected, became thus

the property of the Society of Mechanical Engineers; and on its cancellation at maturity and the execution of the satisfaction piece, The American Society of Mechanical Engineers held an equity of $32,000 in the property which had originally cost $60,000 and which was steadily rising in value with the changes taking place in its neighborhood, due to the execution of the Pennsylvania Railway tunnels and its notable terminal to the westward on 32nd Street.

The Society lived sixteen happy and successful years in 31st Street. The only difficulty had been that in the years after 1900 the attendance at the Annual Meeting in December had exceeded the comfortable capacity of the auditorium. Presidents' addresses had been delivered in Sherry's ballroom and the Society had rented Mendelssohn Hall, on 40th Street east of Broadway, for its big sessions. The last two years of its occupancy at 31st Street the sessions had been held in the hall of the New York Edison Company, on 27th Street west of Broadway. The Institute of Electrical Engineers was meeting the same difficulty, and in addition it had received the splendid gift of the Latimer Clark Library from Dr. Schuyler Skaats Wheeler and had no adequate home to take care of it under the terms of its purchase and gift. The Engineers' Club, a purely social organization, but one in whose success the members of both societies mentioned and also the other organizations were strongly interested, had had to vacate its rented house and was looking for its next step after purchase of land on 40th Street.

It was at this juncture that Mr. Andrew Carnegie was a guest of a banquet given by the Institute of Electrical Engineers in February 1903. He heard the statement of the needs of the Institute and, with characteristic largeness of vision, saw the opportunity to be much greater than the need of any one society. He arranged a conference with the parties interested and at its close penned the following unique letter:

TO THE AMERICAN SOCIETY OF CIVIL ENGINEERS, AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, AMERICAN SOCIETY OF MECHANICAL ENGINEERS, AMERICAN INSTITUTE OF MINING ENGINEERS AND THE ENGINEERS' CLUB:

GENTLEMEN:

It will give me pleasure to devote, say a million and a half dollars to erect a union building for you all, in New York City.

With best wishes,

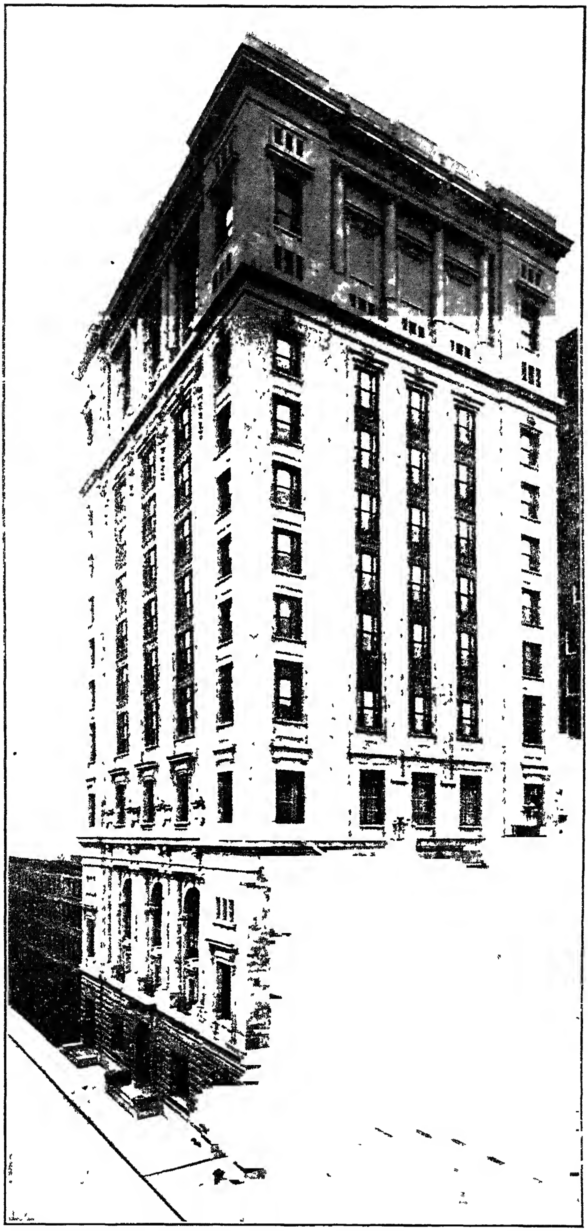
Very truly yours,

(*Signed*) ANDREW CARNEGIE.

March 14, 1904.

The Society immediately rose to this oppor
accepted its share of the gift and its responsibilit
appointed three representatives to sit on the join
mittee to formulate details. These were Messrs.
M. Dodge, President of the Society, Charles W
Hunt and F. R. Hutton. These sat during the
years of planning and construction and were th
trustees under the perfected organization later c
The first year was spent in general planning of sco
function. Definite plans could not be made un
American Society of Civil Engineers should dec
formal vote whether to accept their share of th
which would involve the sacrifice of their satisf
home on 57th Street. In January 1904, that Societ
cluded not to avail of the opportunity to join the
three; and there was some question in a few
whether the donor or recipients could carry o
modified plan of making the building serve many
societies in an associate relation which did not c
financial responsibility for success or failure as w
the three named by Mr. Carnegie. This enlarged
of the building has actually proved of signal ar
tinguished advantage to the profession of engin
although there were a few uncertain weeks wh
plans were swinging in abeyance and uncertainty.

In 1904 the legislature passed the special c
creating the United Engineering Society (see C
XX) as a benevolent and philanthropic corporat



Engineering Societies' Building, 29 West 39th Street

present home of the society

ld and administer the property for the benefit of the ree founders and the indefinite number of associate cieties to occupy the building. A set of By-Laws pre- red by a committee of the representatives of the so- eties was approved by each of their governing boards. may be of interest to state that Messrs. C. W. Hunt, S. Wheeler and F. R. Hutton, members of the So- ety, were the active factors in creating these By-Laws. competition of architects was organized in the nixed'' form, in which certain firms were invited by me to compete and any others not so invited might also mpete on the same terms. The Representative Board as advised in both the preparation for the competition d in judging the competing designs by Prof. Wm. R. are, formerly professor of architecture at the Massa- usetts Institute of Technology, and then professor re- ed from Columbia University. The plans of the ilding Committee of the Representative Board had etty well crystallized as respects the uses to which the ilding was to be put before the competition pamphlet as issued, and in getting these ideas into usable shape e committee were greatly aided by Mr. W. S. Acker- an, member of the Society, who acted as its draftsman d building expert. Meanwhile also the trustees created der the charter, together with the active energy of r. John C. Kafer, had bought five lots on the north side 39th Street, Nos. 25, 27, 29, 31 and 33 with the co- eration of Mr. Carnegie, who had financed the pur- ase and to whom they gave a mortgage for $540,000, aring interest at five per cent. These lots were just in e rear of those belonging to the social organization lled the Engineers' Club, whose building was also to erected by Mr. Carnegie, but which was a separate dy from that created for the societies. After consider- le thought the fund was divided in a ratio of seven three, giving $1,050,000 to the Societies Building, and 50,000 to the building for the Club. The two build- gs were competed for on this basis.

The competition closed in June 1905, and the Com-

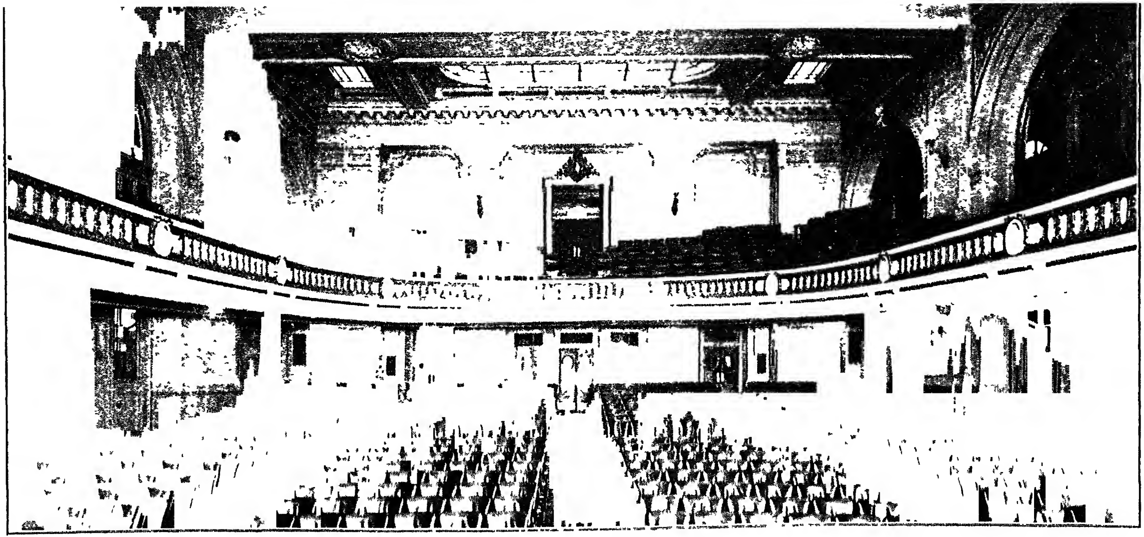
mittee unanimously selected the plans submitted under an emblem which proved to belong to Herbert G. Hale, later of the firm of Hale and Rogers. Mr. Henry G. Morse as junior partner of the firm was specially assigned to construction, and the building contract was awarded to the firm of Wells Brothers Company, general contractors. Mr. Alfred R. Wolff was made expert on the heating and ventilation problem and Mr. C. O. Mailloux on the electric wiring and installations. The trustees had also notable help and counsel as respects the problems of current supply and telephone service from Mr. John W. Lieb, Jr., member of the Society, who came later on the board by appointment from the Institute of Electrical Engineers. Prof. F. R. Hutton was secretary of the Board from the beginning, and the active man on the ground for the building committee. Many details of the building are from pressure which he brought to bear, notably the details of the coatroom equipment. Mr. John R. Freeman, Past-President, was most helpful in suggestions as to safety from fire hazard as respects audiences and assemblies; Professor Sabin of Harvard University carefully considered the problems of the acoustics in the large assembly hall.

The general scheme of the building to adapt it for the specific uses of the Society and for the broader uses of other engineering bodies required the following features:

(*a*) A general entrance foyer on the ground floor or street level, in which registration for conventions could be secured, and the general headquarters business of such large assemblies be conducted.

(*b*) A large assembly hall, one flight up, in which the conventions should be held. The limit capacity of such a hall was long under consideration; for to make it so spacious that only expert and loud-voiced speakers could be heard in debate and discussions would be to frustrate its purpose. One thousand was finally fixed upon, with 600 on the floor and the balance in galleries and standing.

(*c*) A corridor all around both ground floor and gallery, to which members not interested in a paper on the



Auditorium, Engineering Societies' Building

floor might retire for smoking or for a friendly chat. Mr. Hunt also insisted on slopes or ramps in corridors instead of steps where levels changed, to prevent stumbling and possible danger in panic from any cause.

(*d*) Additional smaller assembly halls or rooms for sectional meetings of the large societies, or for meetings of the smaller bodies, either having their headquarters in the building or coming to it only on occasions. Originally there were six such rooms for assembly; but later experience has proved that the demand for them was overestimated and some have been turned over to other and continuous uses. These assembly rooms had the preference on the floors nearest the street, to reduce the stress on the elevator service when several might be in use at one time, and for safety in emptying in an emergency. The lower six floors were thus set aside to general uses.

(*e*) The Library. This was plainly to be allotted to the top floor, for light, absence of dust, quiet, and freedom from flies. The floor level below it was necessarily the book-stack room.

(*f*) The executive offices of the founders. These were three of the office floor levels, and were assigned by lot. The Mechanical Engineers drew first choice and selected the eleventh or upper office floor; the Electrical Engineers, the second choice, took the tenth floor; and the Mining Engineers the ninth.

(*g*) The offices of the associate societies. Engineering societies, not specifically mentioned in the deed of gift as coördinate owners of the building and responsible for its obligations, have been called associate societies and are assigned to the seventh and eighth floors. It was an active administrative problem of the first year to invite associates to take space in the building and bear share of its cost and operation. Now the trustees have a waiting list.

(*h*) The power and heating plant and other usual public requirements of toilet rooms are in the basement and sub-basement. A level for store rooms and vaults under the sidewalk was cut from the building

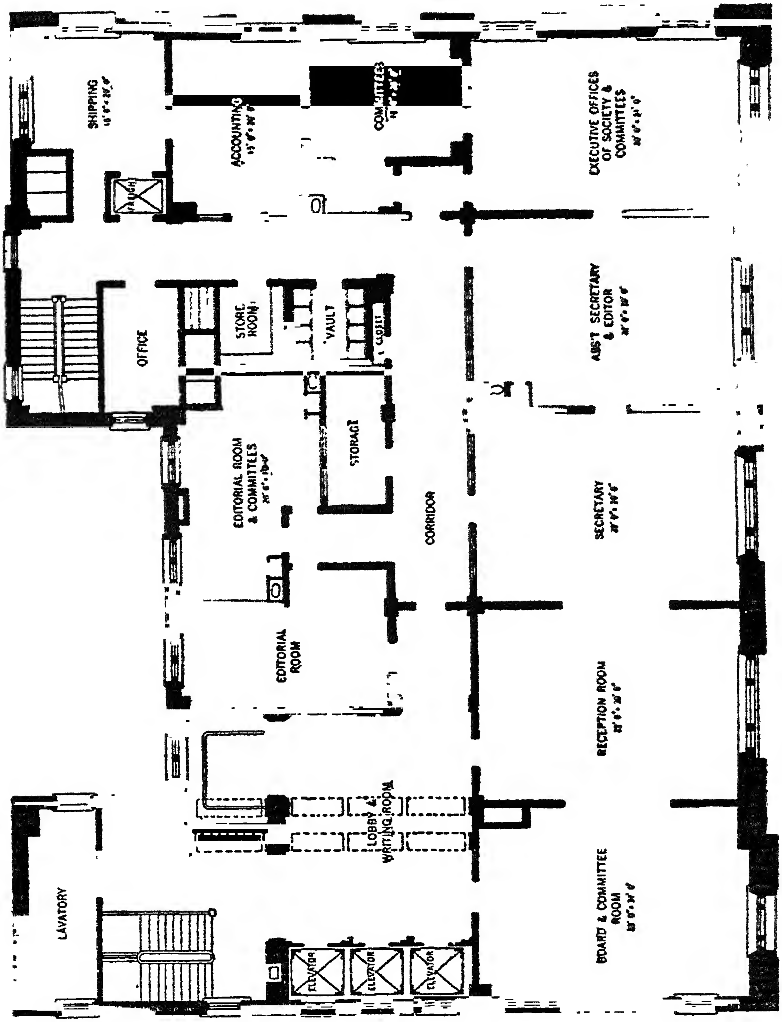
plans to keep within the price limits. An amphitheatr cal lecture room for scientific demonstration was als cut out for structural and economic reasons.

The Mechanical Engineers' floor on the elevent story is arranged so as to offer first a foyer or receptio room. This opens directly from the three elevator exit and is furnished with sofas, chairs and tables and representative of the Society receives all comer whether members or business callers or those making ir quiries.

Opening from this foyer are three exits. One admit to the Council or Committee room, with central table an directors' chairs, and decorated with oil portraits. Th second admits to a general members' reception and reac ing and waiting room, opening into the Council roor on the west and into the Secretary's room toward th east by wide sliding doors. A center table has periodical and other reading matter, while around the walls are lo bookcases and shelves with bound Transactions. O the screen of the wall are photogravure portraits of th Past-Presidents of the Society.

The Secretary's room has his table-desk and th handsome roll-top desk given by the estate of the lat Edwin Reynolds, a gift to him on his seventieth birth day. This desk is used by the Honorary Secretary a his privilege, which he always shares also with the Presi dent of the Society for his term, should he desire to us an office fixture. The walls are made interesting b photogravures of the Honorary Members of the Society

Beyond and behind the Secretary's room is the offic of the Assistant Secretary and Editor, and executive as sistants. In the southeast corner with windows on bot sides is the clerical office, and going northward, come committee room, the accounting department and th shipping office, adjoining the freight elevator at th northeast. On the north side are the editorial rooms store rooms and the fireproof vault. The lavatories are i the northwest corner of each floor adjoining the stairway which latter are in a tower construction within the build



FLOOR PLAN A.S.M.E. OFFICE IN ENGINEERING SOCIETIES BUILDING

ing and isolated from elevators and the rest of the floo by structural walls. The entrance foyer is decorate by the Thurston Memorial bronze and richly illuminate addresses from other societies. The third exit leads t the hallway on which are located the business offices o departments. The foyer has also the beautiful chimin clock given by friends to Mr. and Mrs. John Fritz on hi eightieth birthday and left to the Society in his will.

So much of expert knowledge as to the probable re quirements of such a building went into its planning an arrangement, so much care and time were taken in re vision and study, and so admirably did the architect co öperate with the future users, that the building i singularly perfect for its purposes and uses. Its styl is severely classic and its arrangement so flexibly adapt able, that no considerable structural change has bee even desired. The growth of the interests which cente in the building may ultimately call for an additional floor but this seems many years away. If the philosophy o unifying divergent interests and bringing them into co öperation be accepted as the wise policy for the future o engineering, then no change from the existent me chanical or physical environment of the Society will b called for. The balance of advantages seems to lie on th side of the coöperative and unified center of activity rather than on that of the separate home and subdivisio of such centers. While this principle holds, and it seem to be sound in the opening decades of the twentieth century, the Engineering Building will stand as a monu ment to its wise donor, and a splendid factor in the pro gress, development and usefulness of The American So ciety of Mechanical Engineers. Chapter XV will trea of the significance of the building as respects the develop ment of the idea of a Library.

CHAPTER XII

The Meetings of the Society and What Has Made Them Memorable

Meetings of an engineering and scientific society may be made memorable in a wide range of ways. Among these are:

(*a*) Action taken by the Society thereat, or referred to the governing body to consider and with power to act

(*b*) Papers and topics presented and discussed, in which new discoveries or notable improvements were made public

(*c*) The presence of distinguished personalities and the privilege of hearing and meeting them

(*d*) The opportunity to visit and study engineering achievement in structure or plant or process

(*e*) The surroundings, scenic, historic or having other charm; the contribution of the weather

(*f*) The social opportunity, the meeting of old friends, the making of new; the good fellowship, the memorable story, the jest

(*g*) The fact that all, or some at least, were doing something for the first time, so that the experience of the day was a unique one and not like other days

(*h*) The pleasure in a stolen vacation of a few days, when the harness was thrown off, burdens left where they fell and the member let loose from the schoolroom for a recess

Many of these must necessarily be individual, and therefore different for every meeting. It will be impossible to give weight to them therefore in a general review. The philosophy of adjusting the universal factors in any convention has been elsewhere discussed; and meetings memorable for the presence of distinguished Presidents

of the Society and their notable addresses have been co
ered in the chapter on Past-Presidents and the titles
their papers. There will remain therefore only the oth
factors to be reviewed in a history of the conventions.

The meetings of the Society in its first third of
century to the end of 1914 have numbered seventy
follows:

Place	Date	No.	Class of Meeting	Memb Prese
New York, N. Y...	Feb. 16, 1880........	A	Preliminary.....	
Hoboken, N. J.....	April 7, 1880.........	B	Organization....	
New York, N. Y...	Nov. 4 to 5, 1880.....	1	1st Annual......	8
Hartford, Conn....	May 4 to 6, 1881.....	2	Regular.........	3
Altoona, Pa.......	Aug. 10 to 12, 1881...	3	Regular.........	3
New York, N. Y...	Nov. 3 to 4, 1881.....	4	2nd Annual.....	6
Philadelphia, Pa....	April 19 to 21, 1882...	5	Regular.........	9
New York, N. Y...	Nov. 1 to 3, 1882.....	6	3d Annual......	5
Cleveland, O......	June 12 to 14, 1883...	7	Regular.........	7
New York, N. Y...	Oct. 31 to Nov. 3, 1883.	8	4th Annual.....	13
Pittsburg, Pa......	May 20 to 23, 1884...	9	Regular.........	9
New York, N. Y...	Nov. 5 to 7, 1884.....	10	5th Annual.....	12
Atlantic City, N. J.	May 26 to 29, 1885...	11	Regular.........	7
Boston, Mass......	Nov. 10 to 13, 1885...	12	6th Annual.....	13
Chicago, Ill.......	May 25 to 28, 1886...	13	Regular.........	12
New York, N. Y...	Nov. 30 to Dec. 3, 1886	14	7th Annual.....	19
Washington, D. C..	May 31 to June 3, 1887	15	Regular.........	11
Philadelphia, Pa....	Nov. 28 to Dec. 1, 1887	16	8th Annual.....	21
Nashville, Tenn....	May 8 to 12, 1888....	17	Regular.........	5
Scranton, Pa......	Oct. 15 to 18, 1888....	18	9th Annual.....	12
Erie, Pa..........	May 14 to 17, 1889...	19	Regular.........	8
New York, N. Y...	Nov. 18 to 22, 1889...	20	10th Annual....	24
Cincinnati, O......	May 13 to 16, 1890...	21	Regular.........	16
Richmond, Va.....	Nov. 11 to 14, 1890...	22	11th Annual....	12
Providence, R. I....	June 16 to 19, 1891...	23	Regular.........	27
New York, N. Y...	Nov. 16 to 19, 1891...	24	12th Annual....	29
San Francisco, Cal..	May 16 to 19, 1892...	25	Regular.........	5
New York, N. Y...	Nov. 29 to Dec. 2, 1892	26	13th Annual....	29
Chicago, Ill.......	July 31 to Aug. 5, 1893	27	Regular.........	28
New York, N. Y...	Dec. 4 to 8, 1893.....	28	14th Annual....	26
Montreal, Canada..	June 5 to 8, 1894.....	29	Regular.........	13
New York, N. Y...	Dec. 3 to 7, 1894.....	30	15th Annual....	38
Detroit, Mich......	June 25 to 28, 1895...	31	Regular.........	13
New York, N. Y...	Dec. 2 to 6, 1895.....	32	16th Annual....	34
St. Louis, Mo......	May 19 to 22, 1896...	33	Regular.........	9
New York, N. Y...	Dec. 1 to 4, 1896.....	34	17th Annual....	39
Hartford, Conn....	May 25 to 28, 1897...	35	Regular.........	20
New York, N. Y...	Nov. 30 to Dec. 3, 1897	36	18th Annual....	37
Niagara Falls, N. Y.	May 31 to June 3, 1898	37	Regular.........	13
New York, N. Y...	Nov. 29 to Dec. 2, 1898	38	19th Annual....	35
Washington, D. C..	May 9 to 12, 1899....	39	Regular.........	27
New York, N. Y...	Dec. 5 to 8, 1899.....	40	20th Annual....	46

Place	Date	No.	Class of Meeting	Members Present
Cincinnati, O......	May 15 to 18, 1900...	41	Regular........	144
New York, N. Y...	Dec. 4 to 7, 1900.....	42	21st Annual.....	467
Milwaukee, Wis...	May 28 to 31, 1901...	43	Regular........	156
New York, N. Y...	Dec. 3 to 6, 1901.....	44	22d Annual.....	519
Boston, Mass......	May 27 to 30, 1902...	45	Regular........	375
New York, N. Y...	Dec. 2 to 5, 1902.....	46	23d Annual.. ..	474
Saratoga, N. Y.....	June 23 to 26, 1903...	47	Regular........	315
New York, N. Y...	Dec. 1 to 4, 1903.....	48	24th Annual....	538
Chicago, Ill.......	May 31 to June 4, 1904	49	Regular........	350
New York, N. Y...	Dec. 6 to 9, 1904.....	50	25th Annual....	542
Scranton, Pa......	June 6 to 9, 1905.....	51	Regular........	121
New York, N. Y...	Dec. 5 to 8, 1905.....	52	26th Annual....	700
Chattanooga, Tenn.	May 1 to 4, 1906.....	53	Regular........	212
New York, N. Y...	Dec. 4 to 7, 1906.....	54	27th Annual....	735
Indianapolis, Ind...	May 28 to 31, 1907 ..	55	Regular.. .. .	296
New York, N. Y...	Dec. 3 to 6, 1907.....	56	28th Annual ...	699
Detroit, Mich......	June 23 to 26, 1908...	57	Regular........	269
New York, N. Y..	Dec. 1 to 4, 1908....	58	29th Annual ...	738
Washington, D. C.	May 4 to 7, 1909.. ..	59	Regular........	276
New York, N. Y...	Dec. 7 to 10, 1909...	60	30th Annual. ..	628
Atlantic City, N. J.	May 31 to June 3, 1910	61	Regular..... ..	135
New York, N. Y...	Dec. 6 to 9, 1910.....	62	31st Annual.....	633
Pittsburg, Pa......	May 30 to June 2, 1911	63	Regular........	305
New York, N. Y..	Dec. 5 to 8, 1911.....	64	32d Annual.....	687
Cleveland, O.. ...	May 28 to 31, 1912...	65	Regular........	221
New York, N. Y...	Dec. 3 to 6, 1912.....	66	33d Annual.....	562
Baltimore, Md.....	May 20 to 23, 1913...	67	Regular...... ..	142
New York, N. Y...	Dec. 2 to 5, 1913.....	68	34th Annual....	778
St.Paul-Minneapolis	June 16 to 19, 1914...	69	Regular........	200
New York, N. Y..	Dec. 1 to 4, 1914.....	70	35th Annual....	821

The review and comment on what signalized each meeting will be made by the number of the meeting in Column 3, without distinguishing the Annual or Winter Meetings from the Semi-Annual or Spring Conventions. Some meetings of course have had little to distinguish them outside of the pleasure of their participants.

No. A on February 16, 1880, was of course unique and memorable for its potencies for the future. A. L. Holley made his noteworthy address; John E. Sweet and H. R. Worthington and the others present saw the realization of their dreams.

No. B on April 7, 1880, saw the results of that early planning, the election of the first set of officers, the formal launching of the Society. There were no papers.

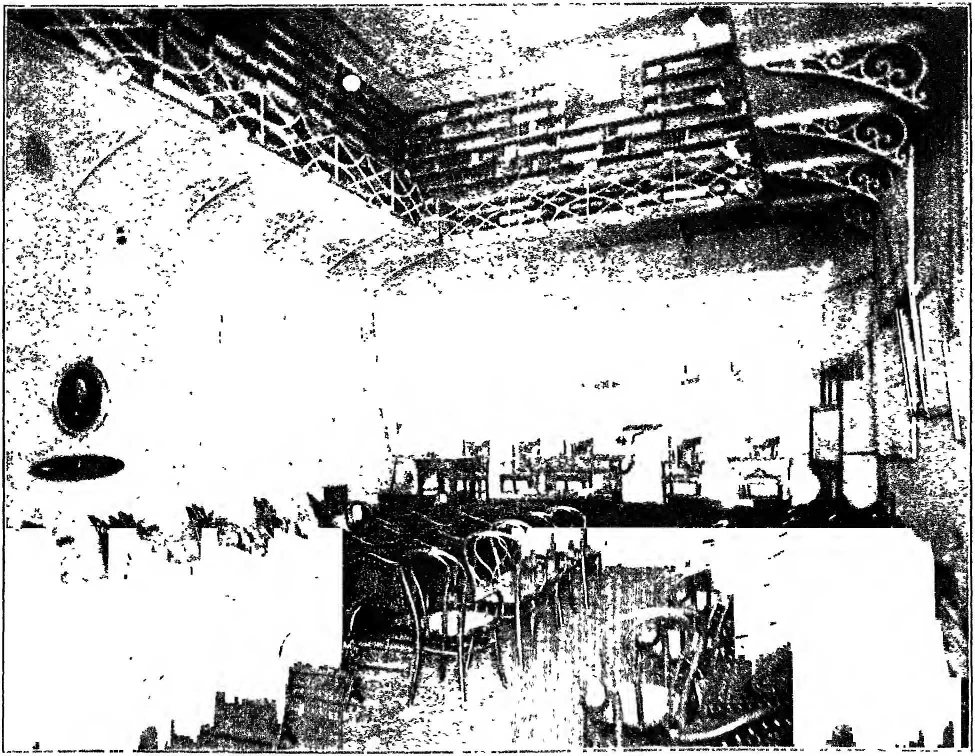
No. 1 in November 1880, was held in the theater of

the Union League Club, later the building of the New York Turf Club, on Madison Square and East 26th Street. It was the first meeting for the reading of papers and to receive reports of action taken in Council on insignia and other administrative detail. There were no excursions. The papers of moment were those by Professor Sweet, J. C. Hoadley and Coleman Sellers on the Metric System. This led to a letter ballot expressing a sentiment adverse to the use of metric units of length in machine shop practice. The membership was then 189.

No. 2, the first Semi-Annual or Spring Meeting. The City of Hartford gave the Council Chamber in the City Hall for the meetings and excursions were organized. Mr. Leavitt's paper on The Superior, and the discussions on Economical Point of Cut-Off, together with Mr. Emery's Tests on non-conductors, were the notable papers. The Society held its first banquet at this meeting and A. L. Holley made that speech so well remembered and so often quoted on the Inadequate Union of Science and Art, which he filled with personal reminiscences of running a locomotive between Providence and New London which had Corliss valve gear with a wilderness of jam-nuts to shake loose and drop off, and yet whose indicator card was an object to adore. Other speakers were James C. Bayles and Thomas Egleston.

No. 3, at Altoona in August, was held pursuant to the practice of the Mining Engineers to hold three meetings a year, one of which was supposed to fall in vacation in midsummer. No other similarly timed meeting was ever held. Amendments to rules concerning handling of papers took much time.

No. 4, was held in the Union League theater, now that of the Turf Club. Professor Thurston presided for the second time at an Annual Meeting and reported action completed on diploma, insignia and the procedure of incorporation under way. Mr. Lycurgus B. Moore insisted on withdrawing as Treasurer. Invitations to visit plants in and near the city were received but no organ-



Auditorium, 12 West 31st Street, looking South, with Diagrams, full Size, of Fritz Lathe

ized excursions were made. Mr. David Williams entertained the Society in a reception at his home.

No. 5, the first Philadelphia Meeting, held in the hall of the Franklin Institute and signalized by the first great reception to the Society. It was held in the galleries of the Academy of Fine Arts. It was regarded both as a high personal honor that such a place should be tendered for the holding of a reception by so representative a committee as one including Messrs. George B. Roberts, A. J. Drexel, George W. Childs, George H. Baker, Dr. William Pepper and Prof. Fairman Rogers; but also that it was an evidence of a mark of the esteem in which the citizens of Philadelphia held the profession of mechanical engineering. Other distinguished receptions have been held since, such as that in the Boston Museum of Fine Arts and the Corcoran Gallery in Washington; but this was the distinguishing *first* event and noteworthy accordingly. This meeting was signalized also by Mr. J. C. Bayles's splendid tribute to A. L. Holley. Mr. Coleman Sellers made the banquet to be remembered by his very clever tricks with cards.

No. 6. There was no later Spring or Mid-summer Meeting for a series of reasons, related perhaps somewhat to an indifference of the Secretary to the necessary labor, and to the assumption that no meeting was expected to intervene before the joint meeting to honor Mr. A. L. Holley, at which Dr. Rossiter W. Raymond was to be the orator by invitation. This memorial session was made a feature of the third Annual Meeting in November 1882, and one entire session was devoted to it. The gifted speaker was in his best vein, and his tribute is a part of the Holley Memorial volume. A fund for the erection of a bronze memorial bust of Mr. Holley was being collected and this was later erected in Washington Park. A later movement in 1898 to transfer it to more appropriate surroundings on the campus of Columbia University, was frustrated by the legal complications as to transfer of city property to ground which it did not own.

Professor Thurston's second term as President came

to an end with the banquet in the theater which ende the meeting. This was also the time of Professor Hu ton's maiden effort at after-dinner humor in response the toast, The Survival of the Fittest; Do the Fitte Survive? Mr. James C. Bayles prepared the list of topi and assigned the parts. Mr. C. J. H. Woodbury spoke c The Mills of the Gods. The pleasant and effective ir pression made by his speech was said afterwards to hav been a factor in securing the office of Secretary for Pr fessor Hutton.

No. 7, held at Cleveland, in 1883, was the maiden effo of the new Secretary after his election. Mr. J. F. Holl way was the active spirit on the ground. The papers the meeting were in galley proof and the cuts printe from blocks on sheets for distribution. The banquet wa held in the opera house. Mr. Chas. F. Brush had h house lighted by electricity and was combining windmi power and storage batteries, a decided novelty. Orga ized excursions of the Society as a whole were als features of the program. The running gear and tra for the observatory dome for the University of Virgin were on exhibition at Warner and Swasey's. Th Cuyahoga Works, where big work was ingeniously do with small machine tools, making the work fast ar moving the tool against it, interested the party; here als Thos. D. West was casting flywheels in the foundry tr enough to run unfinished as to the rim, if need be. Th Otis Steel Works, with S. T. Wellman as its enginee were still forging iron axles with steam operated ti hammers; and the Society visited also the old steel worl at Newburgh. There were no motor vehicle shops in th Cleveland of that day.

No. 8, held in New York in 1883, was held by invit tion in the parlors of the American Society of Civil E gineers, at 127 East 23rd Street. The precedent was n then created of a presidential address, and Mr. Leavi made none. The effort to re-establish the former gover mental commission for the testing of materials was large part of the Society's ambition at that time outsi

of its own intramural interests, and Prof. Thomas Egleston and his colleagues worked assiduously for it, but to no effect. Organized excursions were made over the road of the new, and as yet unused, line of the West Shore Railway and to the works of the Yale and Towne Company at Stamford. The Ordway-Woodbury papers on Non-Conducting Coverings for Steam Piping also signalized this meeting.

No. 9. The meetings in Cleveland and this one in Pittsburg in 1884, had practically fixed the standard of what an acceptable meeting should be to meet the new Secretary's ideals and their general policy has not been notably altered in all the years. The Society was here the guest of the Engineers Society of Western Pennsylvania, and sat with them in a joint session on Natural Gas. The experiment of holding a session for papers on the boat during a sail on the Monongahela River was not a success from a secretarial point of view, the distractions militating against earnestness in debate. The theft of some indicators belonging to Mr. Barrus and exhibited in connection with his paper did not relieve the gloom of this judgment. The advocacy by Prof. W. A. Rogers of the microscope in measuring lengths and pitches of screws had already been made familiar by Mr. George M. Bond's comparator for gages and fine measurement.

No. 10, New York, 1884, was the first meeting held in the auditorium at 12 West 31st Street, while it was still owned by the New York Academy of Medicine. It was the first since Thurston at which a presidential address was delivered by direction and request of the Council, and created the precedent followed ever since. Mr. Horatio Allen, Honorary Member, who had driven the first hauling locomotive on the American continent in 1830, was present and invited to sit on the platform. The movement to start a library began with this meeting and the purpose to create uniform standards in methods of Testing Materials and particularly in shapes of test specimens, which occupied much thought and great labor by the late Gus C. Henning, first took shape at this time.

The Society was urged to do something to correct and embarrassments in the United States Patent Excursions by rail to Paterson and its locomotive and rolling mills, and to the Stevens Institute oi nology were features of the excursion days. Th also, as for two years preceding, the members were of the American Institute at its annual fair. D historical paper signalized this meeting and Wo and Ordway gave valuable contributions.

No. 11. The Atlantic City Meeting in 1885 v first experiment with a purely resort atmospher reunion in a place having no engineering establis to visit. It was intended to emphasize the purely aspect, on one hand and to secure discussion of without distractions, on the other. Fish food was lure for dwellers inland and distant from the sea consensus of opinion at that time was not favor the idea. Atlantic City was not what it has since to be; the fish banquet was poorly served and the sp tedious and disappointing. Mr. Holloway was a presiding officer; and the Society then adopted, aft longed discussion, its policy of recommending sta reported by a committee of experts, but not *adoptin* by vote or other official action. Mr. Kent led in the over this policy, which has prevailed ever since anc later became part of the organic law of the Societ

The Society had its first heavy and earnest dis on the education of engineers as a result of the pa George I. Alden. Mr. Towne presented his conce building for the Society to house its library joint those of the other engineering societies, but the ti not ripe for the germination of that seed, whic somed only after eighteen years had elapsed. A City was signalized also by the first presentat topics for discussion without a paper to open su cussion. They were presented in question form un title of Topical Queries, and were a feature of m and the publications for many years. The Socie

at this meeting discovered the ability of Mr. James M. Dodge as a raconteur and entertainer.

No. 12, at Boston in 1885, saw the first of the movement to have the Annual Meeting swing through the three big sea coast cities in rotation. Mr. C. J. H. Woodbury was the active factor. The meeting was held under the auspices of the Massachusetts Institute of Technology, of which General Francis A. Walker was the gifted and genial president. Visits were paid by boat to the sewage pumping engines, recently completed by E. D. Leavitt and designed as to their delivery and inlet valves to act on solid and semi-solid material in the outflow; and by rail to Lawrence and its mills. It was on this train that the first digest of rules for debate was tentatively formed by Mr. Henry R. Towne and the Secretary. The banquet was tendered by the City of Boston and its slow-moving speech delayed the evening session beyond all reason. The Secretary's apology and explanation was silently given by drawing on the blackboard a tombstone which bore the epitaph: "This man was talked to death."

No. 13, in Chicago in 1896, was the first to try out the rules for control of debate, based on the principle that all papers should be put into print and placed in the members' hands and that they be read by them in advance of the session. Also that five, or at most, ten minutes be allotted to the author to present his paper in abstract, and that written discussion have preference over *viva voce* talk, five or ten minutes being allotted to each, and each paper have an allotted space and time, so that no prejudice be suffered by the last author other than an inevitable fatigue of the audience caused by an extended session. Excursions were made to Pullman and to the North Chicago Rolling Mill.

Mr. Towne presided as Vice-President in the absence of Mr. Coleman Sellers, and presented his now historic paper on the Engineer as a Specialist in Economic Problems; Mr. Wilfred Lewis gave his paper on Belting; Mr. Babcock one on Substitutes for Steam. At the banquet Mr. Kent made his startling prophecy that, just as we

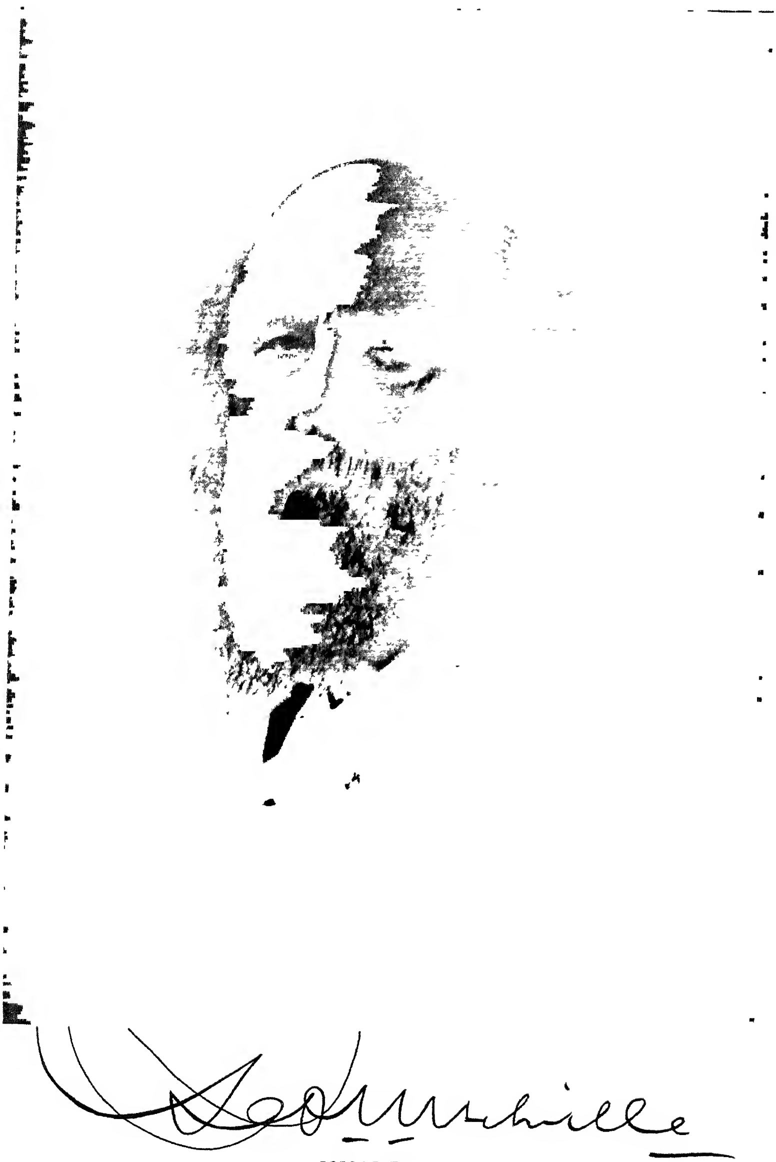
had seen at the steel works the raw material ente the blast furnace as ore and flux, and thence pas without cooling into convertor and rolling mills coming out at the last end in merchantable form witl appearing at all in the form of iron known as "pig," the future visitor to the stockyards of Chicago w see corn and other porcine substance entering a g hopper at one end, and coming out at the farther en all forms of stockyard product—bacon, ham, sausage lard—without stopping to enter or tarry in the wil domesticated form of "pig."

No. 14, in New York 1886, Mr. Towne presidin Vice-President. No presidential address. Mr. P ridge's paper on Capital's Need of High-priced La was that of notable interest at the side of the Reule paper on the Friction in Gears.

No. 15 was the first Washington Meeting. The m points both of technical and administrative interes the capital city made this a memorable meeting. Baldwin gift of Hoadley apparatus was announced, the Committee on Standard Pipe-threads reported. Society went in a body to Mount Vernon, and lunche *fresco* at Marshall's Hall on the Maryland side of river. The reception tendered by Hon. Josiah Dent his son Edward L. Dent in Georgetown, was a deligh experience. The house belonged to the Colonial pe and in it John C. Calhoun entertained General Lafay Mr. H. Ashton Ramsay, who had been engineer-in-c on the armor-plated Merrimac of the Confederate N spoke on the Needs of the Navy. Mr. Kent discu Profit Sharing.

No. 16, the second Philadelphia Meeting and the nual Meeting of 1887, was signalized by the excursio Bethlehem and its new armor-plate plant, by the u courtesy in the great plants of the city and suburbs, by a reception in the Academy of Fine Arts. Presi Babcock delivered his address.

No. 17, at Nashville in early May 1888, signalized first example of a policy of holding meetings where



PRESIDENT 1899

OF

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

presence of the engineers would be serviceable to the development of the industry of the district. The mechanical engineering department at Vanderbilt University took a large share in the getting up of the meeting, and the Governor of the State and the Mayor of the City did their share in welcoming the visitors. The cornerstone of the new mechanical engineering building was laid with appropriate ceremony and with addresses by Mr. Kent and Professor Hutton. The trip from the coast to Nashville was made in special cars—the first step in a long series of this kind—with a stop-over at Cincinnati where the party was received by the members. Visits were made to Fisk University for colored men and women, and to Belle Meade, the notable stock farm and estate of that region. A visit to Chattanooga and Lookout Mountain closed the series of excursions. Mr. Woodbury presented a paper on Electric Welding, then a novelty. Mr. Horace See presided.

No. 18, at Scranton, Pa., in October 1888, was presided over by Vice-President C. J. H. Woodbury, by reason of the illness of President Horace See. At this meeting was read the invitation to the Society by President E. N. Carbutt of the Institution of Mechanical Engineers that The American Society of Mechanical Engineers be their guests in a probable visit to England and Paris in 1889; and the announcement of the Alfred B. Couch testamentary bequest was made. The meeting was signalized by the discussion on the policy of holding two meetings each year or only one. The Society decisively expressed its approval of the existing plan of a Spring and a Fall Convention. The Society visited Honesdale where Horatio Allen, late Honorary Member, had run the first commercial locomotive on this continent in 1830, and enjoyed a run over the gravity lines of the Delaware and Hudson Railway.

No. 19, at Erie in May 1889, was held just previous to the sailing of the organized party for England. It enjoyed its privilege of a visit to the veteran U. S. S. Michigan with its old engines. Henry R. Towne presided and

gave his notable paper on Gain Sharing as preferable to a sharing of profits, and James W. See presented his paper on Standards.

No. 20, in New York in 1889, was memorable for the report of the courtesies enjoyed in England and France, and for the first proposition of a society of engineers to be largely representative of American engineering and include all its specializations. It was the last New York Meeting held in a rented auditorium for many years, for thereafter the Society owned the building at 12 West 31st Street in the rooms of which it had been holding its New York Meetings since 1884.

No. 21, in Cincinnati in May 1890, is memorable to the then Secretary of the Society as being the one meeting during his term of 23 years which he was not able to attend, by reason of sickness in his home. The Committee to memorialize the Congress of the United States with respect to a suitable memorial for the late Captain John Ericsson, member of the Society, who had done so much in the years 1861-1865 and at other times, reported its recommendations.

No. 22 was held in Richmond, Va., in November 1890, with a view to bringing into the city of the old aristocracy of the South a knowledge of the men and personalities who were energizing its new industrial upbuilding. Mr. E. F. C. Davis, as the master mind in the details of the meeting, had some amusing misunderstandings as to the type of cultured gentlemen who made up the Society, and enjoyed the pleasant surprise of a social leader when introductions were effected to some of the leading spirits. A visit to the points of historic interest in the city was an experience to be remembered. This was the first Annual Meeting after the Society became through its Library Association the owner of its home in 31st Street.

No. 23, in Providence, R. I., in June 1891, was most enjoyable socially and all the New England members were able to reach it. The Society enjoyed an excursion on the bay and on its way to a clam bake saw the Herreshoff

yacht, *Stiletto,* weave circles all round the paddle-steamer carrying the party. Mr. Halsey's paper on a Premium Plan for Paying for Labor was presented at this meeting.

No. 24, in New York, 1891, was the first Annual Meeting of the Society in its own home, and was memorable as the time at which the low dues of the previous decade were increased by $5 in each grade, to the greatly increased effectiveness and opportunity of the Society. Mr. Robert W. Hunt presided with great tact and skill in the delicate presentation and unanimous discussion and vote.

No. 25, in San Francisco, was memorable as the first Pacific Coast meeting. The members made up a special train load under a competent salaried guide, and were taken to points of scenic interest while on the journey across the continent. Cable railway engineering on the hills of the city was new to the easterners, and the beauty of California in May will never be forgotten. The Technical Society of the Pacific Coast were the hosts of the meeting, and many most enjoyable visits were made. Mr. Stahl's paper on Utilization of the Energy in Ocean Waves, was a notable paper.

No. 26, the thirteenth Annual Meeting in New York in 1892, was signalized by the movement to create a standard American engineer's gage for the thickness of metals, whose numbers should be the thicknesses in thousandths of an inch. Mr. Thomas F. Rowland, builder of the Ericsson Monitor, was present at one of the sessions and received the compliment of a reception by rising. This meeting received a report from a strong committee on the methods to be followed at the approaching Columbian World's Fair if any physical or mechanical tests should then be conducted upon any apparatus exhibited. Papers on the Stresses in Flywheel Rims began to appear at this meeting.

No. 27 was the session of the Mechanical Section of the World's Engineering Congress of that year, and will be referred to in detail in another chapter. It was marked by the inclusion of all the sections in special courtesies secured by and through the Society for its

members. Mr. H. F. J. Porter of the motive power (vision was particularly effective in this matter. T: meetings were in the Memorial Art Palace in pleasi: proximity to the noise of the exhaust of locomotives (the Illinois Central tracks.

No. 28, in New York 1893, received the report of t: special activities at the World's Fair in Chicago and pa ticularly of the return courtesies to the members of t: French Society of Civil Engineers in September, to ' elsewhere referred to. Portraits of Joseph Harrison a: of Francis Reuleaux and a model of Ericsson's Monit were acknowledged.

No. 29 was signalized as the first meeting outside the boundaries of the United States, being held Montreal, Canada, in 1894. Mr. Coxe presented notable paper on Technical Education. The Socie was made the guest of McGill University, and S Donald A. L. Smith entertained the members and the ladies at his beautiful home.

No. 30, in New York in 1894, had no presidential a dress as Mr. Coxe was serving his second term as pre: dent. Mr. Keep's papers on Tests of Cast Iron began this meeting.

No. 31, at Detroit in 1895, was the only meeting which Mr. E. F. C. Davis presided. He lost his life the late summer in an accident while riding his hors Mr. Taylor's first piece-rate paper was presented at th meeting, and Mr. Keep continued the report of his r searches.

No. 32, in New York in 1895, was saddened by t recent death of President E. F. C. Davis.

No. 33, in St. Louis in 1896, was a swing of the loc tion of the place of meeting to the Mississippi Valley.

No. 34, in New York in 1896, was made memorab by President John Fritz's paper on the Progress in t' Manufacture of Iron and Steel, and was illustrated by drawing of a full-size gun-ingot in its lathe. The dra ing was too big to go on the end wall of the room. memorial session was also held to record the feelings

the members on the death of Past-President J. F. Holloway.

No. 35, in 1897, was a second meeting at Hartford. The excursions were made successful by dividing the party into three groups.

No. 36, in New York in 1897, was signalized by the gift of an oil portrait of Robert Fulton, stated to have been painted by himself.

No. 37, at Niagara Falls in 1898, was interesting by reason of the experiment then tried, of operating a convention without a local committee or any local subscription of funds to meet entertainment expenses. Each member paid for himself and for any guest whom he might have. This was done by a series of tickets purchasable at headquarters and securing for the member any excursion opportunities which he might select. The reception and dance was similarly financed and the plan worked well. Mr. Emile Geyelin, the veteran designer of turbines, was a guest of the Society.

No. 38, in New York in 1898, was in charge of President Chas. Wallace Hunt and was signalized by visits to the great power plants of the City, and by the gift to the Society of an oil portrait of John Fritz.

No. 39, in Washington in the Spring of 1899, was memorable for its size and the pleasure which it gave to all present. The excursion to Mt. Vernon was the occasion for the planting of a memorial oak tree. The reception was held in the new building of the Corcoran Art Gallery and the Marine Band made the music most enjoyable. Mrs. George Westinghouse helped Rear-Admiral Melville to receive his guests, and a splendid reception was also tendered by Mr. and Mrs. Westinghouse. Many notables of Washington were present. President McKinley was unable to receive the Society, but the members were admitted to the White House.

No. 40, in 1899 in New York, was signalized by President Melville's address on Engineering in the United States Navy, and by Mr. Kerr's paper on the Engineering of the New South Terminal in Boston. Mr. Higgins'

paper on Education of Foremen, Machinists and En neers was also a noteworthy discussion.

No. 41, at Cincinnati in 1900, was the second meeti here, and was marked by the first motor vehicle pap

No. 42, in New York in 1900, had a paper on Ea History of High-Speed Engineering. The second mo gage on the house of the Society was reported cancell and paid. This meeting was signalized by a session Columbia University, by invitation of President Lc then in office. The recently built mechanical laboratori on a scale larger than their predecessors, were obje of interest. Professor Hutton, the Secretary of t Society, had been the creator of their plans and secur the equipment.

No. 43, in Milwaukee, was signalized by a numl of papers discussing the exhibits at the Exposition Paris the previous year. The Society visited the Al plant, of which Mr. Edwin Reynolds was the engine ing authority. The Milwaukee Meeting brought up t question a little later of the organization of a Milwaul branch or section; but the action of the Council in stricting not only control of the group but also memb ship in it to members of the Society, was ill-conceived a resulted in the dropping of the idea in that form. amendment was offered to increase members' dues fr $15 to $25.

No. 44, in New York in 1901, was signalized by M Gantt's paper on a Bonus System of Rewarding Lab a further study in scientific management and promoti of efficiency in the human factors of production.

There had been, as is the case in most societies this kind, a progressive party with an ambition for pansion and an accompanying tendency for expenses outrun receipts, and it was found that under this poli the Society's affairs had become somewhat involved, penses per annum per member having increased m terially notwithstanding the growth in membership.

The remedy proposed for this state of affairs w

the above-mentioned increase in the dues from $15 to $25 per year.

Its proposal brought out considerable discussion in the interim between the Milwaukee and the subsequent Annual Meeting, with the result, among other things, that it was discovered that by the terms of the law under which the Society was incorporated, members were given the right to appoint proxies. Publication of this fact in the *American Machinist* led to the appointment of a Committee to receive such proxies and to the overwhelming defeat of the proposal to increase the dues after a lengthy and valuable discussion.

A monument to Robert Fulton in Trinity Churchyard, New York, was unveiled. A sermon was preached by Robert Fulton Crary, a grandson of Robert Fulton, and a technical address delivered by Rear-Admiral Melville. Professor Thurston also made an address. A full choral service was held; and appropriate ceremony observed at the monument. The veteran, Chas. H. Haswell, and Engineer-in-Chief Geo. W. Melville were present at the unveiling, as shown in the interesting photograph.

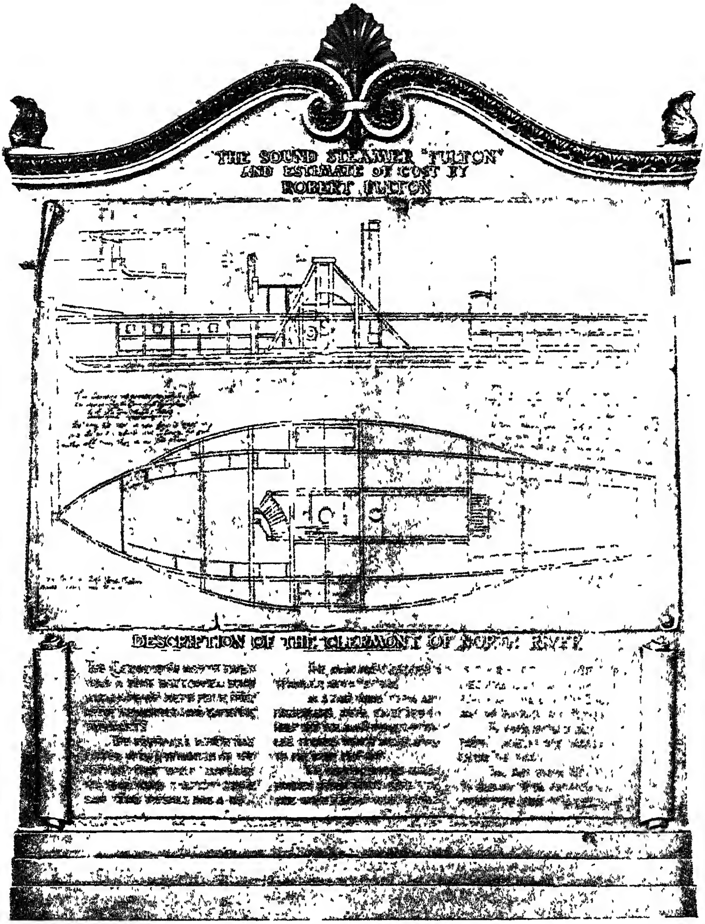
No. 45 is interesting by reason of the presence of notable engineers at its sessions. The photograph shows the Council meeting during its continuance. Prof. R. H. Fernald gave papers resulting from his research work on the internal-combustion engine, the beginning of much valuable later work; and Mr. Geo. H. Barrus reported further researches on non-conductors of heat for steam pipes in power stations.

No. 46, in New York 1902, marked the passage of the limit of capacity of the society auditorium to accommodate the members coming to an annual meeting. The opening and closing sessions were held in the house; the others in the banquet hall of the Sturtevant House, then standing, on Broadway between 28th and 29th Streets on the east side. Vice-President Waitt presided in President Reynold's absence.

Certain questions of internal administration and financial policy were reported at this meeting, such as

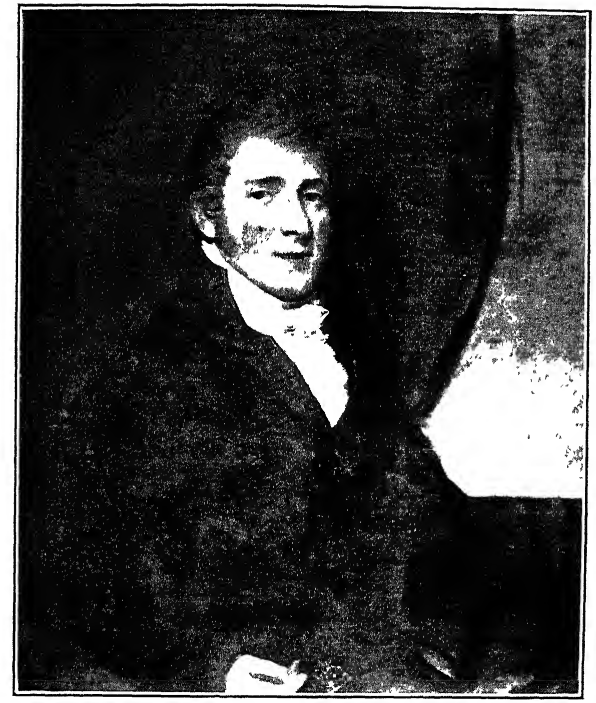
the fiscal year, the reserve fund, and the recomm for a rewriting of the Rules. New books of ac more modern dress were ordered and a computa sented as to the cost and return per member. appendices to the annual report of the Coun analyses which were most helpful in deciding q then under advisement. The Committee in Bosto 45 presented some questions for the membershi on that the committee might be guided by the an their later work: junior dues, life membership fe balls for members, membership of Past-Presi the Council, quorum, group organizations were in this list. Mr. Gus C. Henning presented a v plete proposition to organize the Society into sec to have the national body an aggregation of su federated together. Mr. Halsey's paper on th the Metric Unit of Length created much discu view of the fact that a bill was pending in Cor make the metric unit compulsory upon the gov departments and service, and therefore to co civil industries dealing with the government to i these units into their shops and drawing rooms. ciety visited the power plants of the Edison Company, the Street Railway Company Elevated Railway.

No. 47, in Saratoga in June 1903 was mem three ways. First the Society accepted the n of Constitution, By-Laws and Rules and orde the routine of a letter ballot. This was pract acceptance in the form submitted by the commit latter had sent their draft in tentative form t voters in advance of the meeting, asking for tions for its amendment, and a few had been This was a great step taken in the history of th and opened new doors for usefulness. The sec the formal expression of the Society, so far a cent of those voting could be so regarded, agai pulsory adoption of the metric system as the o system and standard in the United States. Thi

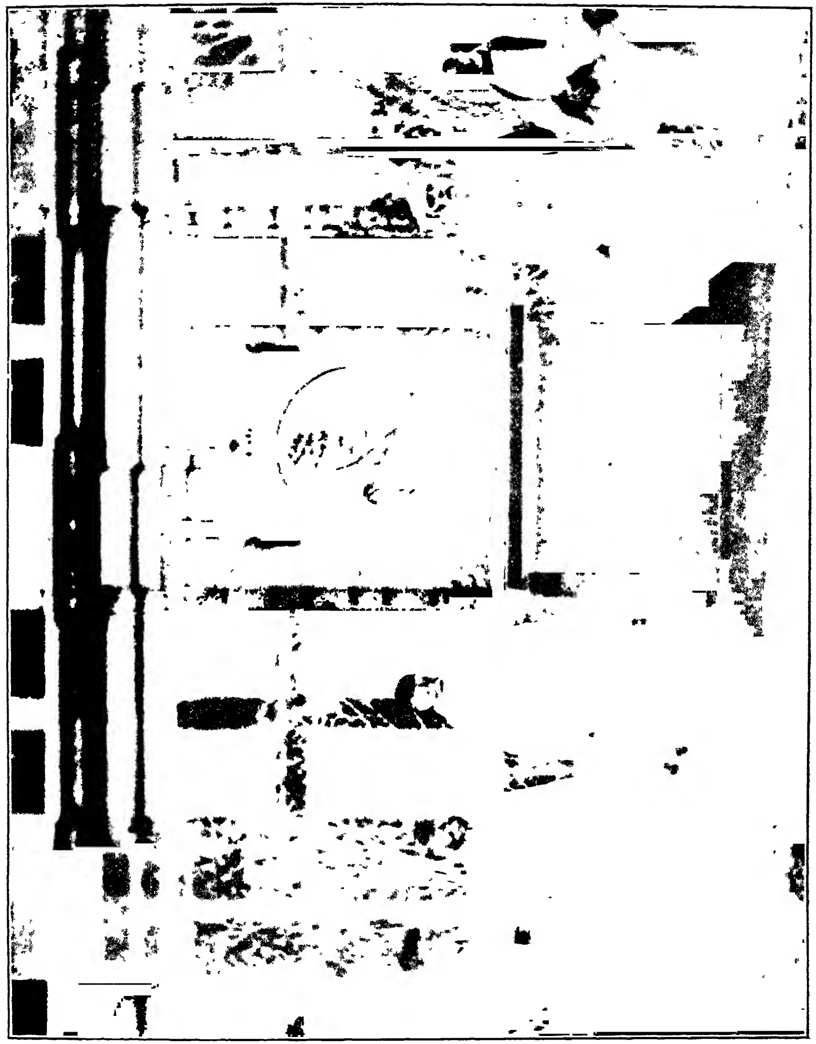


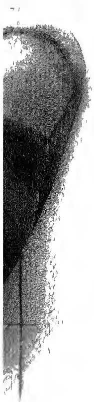
THE FULTON MEMORIAL IN TRINITY CHURCHYARD, 1901

THE FULTON MEDALLION ON THE MEMORIAL MONUMENT



The Portrait of Robert Fulton, Painted by Himself
THE PROPERTY OF THE SOCIETY





was the formal action by the Society as a whole, confirming Council action, as to accepting the gift and responsibility of a great union building for the engineering societies, as contained in Mr. Andrew Carnegie's promise. The meeting was also unique in its plan of going to a great hotel town and making that its headquarters, visiting the manufacturing interests in Schenectady and Troy by excursion therefrom. Neither of these latter places offered adequate facilities for a large number. Railway conventions were also in town with exhibits of interest to engineers. The young college graduate engineers of Schenectady furnished a minstrel and musical evening of pleasant memory.

No. 48, in New York in 1903, was convened for some of its sessions in the home of the Society, and for others in the Hall of the Mendelssohn Union on 40th Street near Broadway. Some active discussion was held about the methods to amend the Constitution. Mr. Dodge's notable paper on the Money Value of Technical Training was a feature of this meeting. A session was also held at Stevens Institute of Technology, and included a practical demonstration of the operation of thermit in producing welds and mending fractured castings.

No. 49, in Chicago in 1904, was a regularly organized joint meeting of the Institution of Mechanical Engineers of Great Britain and The American Society of Mechanical Engineers. Their President, Mr. Hartley Wicksteed, presided alternately with Mr. Ambrose Swasey; and both Mr. Edgar Worthington of the British Institution and Prof. F. R. Hutton of the American Society were on the platform at all times. Papers were contributed by members of both societies and published in the volumes of Transactions of both. The excursions around Chicago to rolling mills and electric power plants and down the drainage canal were participated in by both, but organized by the American Society.

No. 50, in New York in 1904, was held both in the home of the Society and in the Hall of the Mendelssohn Union. The meeting was signalized by the reports of

progress as respects the preliminaries for the Engineering Building, the determination to keep on with the plans in spite of the decision of one of the original parties not to enter the compact of the others, the reports of the procedure for making the visits of the foreign engineers as useful to them as possible, the start of the new movement for a joint library of all the societies, and the movement to make tests of fuels under the Geological Survey of the United States. Mr. J. M. Dodge presented the replica of the Ericsson bust. Professor Benjamin reported tests on model flywheels.

No. 51, at Scranton, Pa., 1905, was the second meeting in that city. It incorporated visits to the plant of the correspondence schools with illustrations of their methods, and a trip to Wilkes-Barre over the electric line.

No. 52, in New York in 1905, frankly confessed that the home of the Society was inadequate for all the functions of the Annual Meeting and the Society accepted with pleasure the courtesy of the New York Edison Company at 44 West 27th Street, both for this meeting and for No. 54 the following year. A handsome monogram or cipher of the Society initials, in electric lamps of various colors, was presented and exhibited at this meeting. Mr. Freeman's notable paper on Safety of Theaters from Fire, was read and the Society was the guest of the Hamburg-American Line for a visit of inspection, a luncheon and the holding of a session in its saloon. The contract for the engineering building had been let in July of this year. A visit to the Worthington plant at Harrison, N. J., was a feature.

No. 53, in Chattanooga, Tenn., in 1906, was signalized by special transportation from New York by way of Washington. The visit to Lookout Mountain and to Chickamauga battlefield were features of this meeting, and the first movement in search of conservation of mechanical resources of the country. The trip by boat down the Tennessee River to the navigation canal and power plant, where governmental and private initiative had come together, was greatly enjoyed. While the Secre-

tary had resigned before this meeting, he was still in office, and his successor was actively sought.

No. 54, in 1906, was signalized by Mr. Fred. W. Taylor's monumental presidential address on the Art of Cutting Metals. The Engineering Building was completed, but scarcely ready for use. Many visited it. The Society made its memorable visit to the proving grounds of the United States Army at Sandy Hook, witnessed discharges of rifles and cannon and visited casements and carriages. Luncheon was served in Fort Hancock. The consternation of some who were not citizens of the United States was a feature of a visit to a U. S. Reservation where such foreigners were not admissible. Ordnance officers of high rank were the hosts of this most enjoyable visit, General Crozier, General Murray, Colonel Smith, Colonel Birnie and others.

No. 55, in Indianapolis in 1907, was presided over by the President, who had been the Secretary since 1883; and Mr. Calvin W. Rice as Secretary was in evidence for the first time. The motor vehicle industry of the city was a feature of the engineering visits, and a day at Purdue University at Lafayette was greatly enjoyed under the leadership of Professor Goss who was then in charge there, and who showed the party the locomotive testing plant which had made the designer and the results of testing famous everywhere.

No. 56, in New York in December 1907, was in many ways one of the Society's most memorable meetings of the period covered in this history, inasmuch as it was the first Annual Meeting in the new Engineering Societies Building. The first meeting of any kind to be held in it was that in the previous winter, at which the paper by Mr. Fish on Trade Secrets was presented. The dedication of the building and of its auditorium had taken place with appropriate ceremony in the previous April, but this was the first Annual Meeting. It had the largest enrollment in the Society's history, over thirteen hundred members and guests being present. President Hutton gave his retiring address, in which he spoke of the

development of mechanical engineering since Holley's address of 27 years before, and offered a new definition of the term "Engineer." It spoke also of directions in which the past history of the Society seemed to bring the opportunities for expansion, as it were, open doors for its widening future. Excursions to the Hudson River Tunnels were made under the guidance of Mr. Charles M. Jacobs, their chief engineer, and an illustrated lecture on the work of photography in colors was given. The evening receptions were held by the Society in its own building, but the floors were not well adapted to dancing.

At the close of this meeting Professor Hutton was elected Honorary Secretary by the Council. Additional Watt and Fulton memorabilia were presented.

No. 57, at Detroit in 1908, was memorable for its success in securing joint sessions with the Societies for Engineering Education and the Automobile Engineers; for its excursions on the Detroit River and to a shipyard where a launching was witnessed; and for the visits of inspection to motor vehicle and other plants.

No. 58, in New York in 1908, reported the gift to the Society of the beautiful desk which had been presented to Mr. Edwin Reynolds, Past-President, on his seventieth birthday, by his former employees.

No. 59, in Washington, D. C., in 1909, was signalized by the dignified reception of the Society by President Taft and by exhibition drills at Fort Myers; also by illuminating addresses on the work of the reclamation survey in irrigation in the West; and by the ceremonial of presenting a portrait of Rear-Admiral Melville, Past-President of the Society to the National Gallery.

No. 60, in New York in 1909, was characterized by the very complete organization of the local membership into committees; by a lecture by L. W. Ellis and B. T. Galloway of the United States Bureau of Plant Industry, on the Era of Farm Machinery, and particularly the changes wrought by the internal-combustion engine which is practically independent of water. The Society visited the new Pennsylvania Railroad terminal at

Chas. H. Morgan

PRESIDENT 1900

OF

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

32nd Street under the guidance of Mr. George Gibbs of the Pennsylvania Railroad, and of Mr. Walter C. Kerr at the head of the contracting firm of engineers.

No. 61, at Atlantic City, 1900, took place just before the start of the organized party for England to take part in a Joint Meeting of the Institution of Mechanical Engineers of Great Britain in Birmingham and England.

No. 62, in New York in 1910, was notable for Mr. George Westinghouse's address on the early history of the Compressed-Air Train Brake. Section meetings were a feature of the program. The transatlantic party reported through the two Secretaries.

No. 63, in Pittsburgh, Pa., in 1911, was the second to be held there after a lapse of many years. The organization of sections of the Society as a policy distinct from meetings of the Society in different cities was discussed.

No. 64, in New York in 1911, was again a very large meeting and called for simultaneous sessions to complete its work within the limit of days. The reception was held at the Hotel Astor, as for several years past.

No. 65, in Cleveland in 1912, was the second in this city, and held after a considerable interval. Mr. Ambrose Swasey was the leading force. A most hospitable and inclusive entertainment was provided.

No. 66, in New York in 1912, was memorable for the preliminaries for the trip to Germany in 1913 under the auspices of the Verein deutscher Ingenieure, and for the scholarly address of the retiring President, Alex. C. Humphreys. The Committee on Standard Tests for Power Plants reported in full. The social event of this meeting was the dinner commemorative of the eightieth birthday of Prof. John E. Sweet, a Founder of the Society. It was very largely attended and full of a most beautiful spirit of loyalty and affection. It was the first of its kind to be given in the Societies' new building.

No. 67, at Baltimore 1913, was signalized by the interest attaching to the old town, the Naval Academy and the Experimental Station. This meeting was held just before the start of the organized party for Germany.

No. 68 was the thirty-fourth Annual Meeting held in New York, and that at which a new and extended standard for flanges of pipe was presented and urged. Mr. John W. Lieb presented his notable collection of volumes on Leonardo da Vinci as artist, architect, engineer and scientist, and shortly thereafter made a valuable gift to the Society of monographs on that subject. This meeting also signalized the permanent policy of holding synchronous sessions for the reading of papers in different departments of engineering.

No. 69 was a meeting in the Northwest, held under the joint auspices of the twin cities of St. Paul and Minneapolis and gave the members an opportunity to realize the great technical progress of that section.

No. 70 was the thirty-fifth Annual Meeting, held in the City of New York. While any public announcement of Mr. Ambrose Swasey's gift which was to create an Engineering Foundation for the conduct of research and the benefit of humanity would have been premature at this meeting, the fact of his purpose was known to a limited circle who were as yet bound to secrecy in the matter by Mr. Swasey's expressed wish. The air was vibrant with suppressed excitement and interest and the feeling that this foundation marks the beginning of a new and splendid era of engineering progress. The social event of the meeting was a combination of a dinner and dance at the Hotel Astor, at which the feature of progression from table to table was most successfully combined through the skill and planning of the committee in charge. The great Boiler Code was formally presented and discussed, both at the regular and extra sessions of the Society, and was later taken up again in final revision by this Committee with an assiduity and devotion unparalleled in the history of any similar undertaking in any technical or professional organization. The work of this Committee signalized the opening of the administration of Dr. John A. Brashear and the close of the period covered by this history.

CHAPTER XIII

Early Monthly and Local Meetings

The previous chapter has discussed the general meetings of the Society as a whole, coming together in the first week of December in each year for an Annual Meeting, at which officers are elected, and in the Spring, in May or June, for a second or Semi-Annual Meeting. The Annual Meeting hears reports of the Council and of the various standing administrative committees and is the business meeting as respects policies and recommendations. The Spring or Semi-Annual Meetings are mainly professional, largely devoted to papers and discussions and to excursions to points of engineering interest.

In the early years of the Society and previous to the purchase of the home building at 12 West 31st Street, these were all the meetings that were held. The idea of meetings between the conventions was in the minds of a few, but the time was not ripe for that step.

As soon as the house was fairly possessed and ready for use, the idea of using its auditorium and parlors more frequently than only on three days of the year began to bear fruit. The first step was that of purely social evenings at which the members within a practical radius could be brought together for acquaintance and for the strengthening of the bond of a common membership, on some one evening of the winter months. This was an entirely local and individual concept. A New York Committee was formed to look after the necessary light collation or supper on such evenings, and each person coming to them, whether man or woman, paid fifty cents at the coatroom towards expenses. The first of these reunions, in the winter of 1890-1891, were

musical, with piano solos, singing and choruses. The choruses were written out on the typewriter, then photographed and projected on the screen, compelling every singer to hold up his chin and securing the sound of every singing voice. It was odd, however, to find how narrow was the range of folk music which every one knew. Violin solos were also possible, and one evening there was a musical phonograph, then something of a novelty.

In the second winter the novelty of these reunions for their own sake had worn off and it was plain by the lessening numbers that some stronger inducement must be held out. This was done in 1891-1892 by getting the members together to listen to an address by James C. Bayles on the work and achievements of Alex. L. Holley, incident to a presentation of an oil portrait of Mr. Holley. The gift was by Mrs. Bunker (late Holley) and was the first of the series, and Mr. Bayles said he hoped the assembly hall might grow to be a sort of Pantheon, in which portraits of eminent engineers could be gathered together. Reunions of that year were centered around Robert Fulton, the History of the Locomotive, Electricity Previous to Galvani, and Egypt, New and Old. These were all illustrated by lantern slides, exhibited by a lantern designed by the Secretary and supplied with his lenses. The last one was a similar evening to the first, a portrait of Henry R. Worthington and the gift of his son, Mr. C. C. Worthington, being then received. The Society on this second winter had portraits of its two founders and a pastel of W. J. M. Rankine, procured by the Secretary in Glasgow in 1889, hanging on its walls.

In 1892-1893 the professional evenings were inaugurated to discuss a topical query, but without any form of collation. These evenings discussed Boilers, Cost of Power, and Castings. The social and nonprofessional evenings of that winter were illustrated talks on the Geography of the Moon; the Buildings of the Columbian Exposition compared with others; and the Orchestral Phonograph. These were more elaborate

than their predecessors and each person attending paid one dollar as his share. The House Committee of the Society had them in charge and all members were notified of the dates, so that if other engagements brought them to town they might choose the dates of the reunions for the time of their visit.

In 1894 the topics covered the Steam Engines of the Columbian Exposition; Water Tube Boilers in the United States Navy; the Sellers-Emery Testing Machine; Machines for Testing Materials. From 60 to 100 members from the city and out of town used to attend these gatherings. The collation usual at this time was served in the so-called banquet room below the auditorium.

At the Annual Meeting in 1894, the veteran M. N. Forney offered a resolution that the Council appoint a Committee of the Society to arrange for monthly meetings as one of its stated activities, and that such committee have full power to settle all questions of detail and to solicit subscriptions for their expenses. The resolution was favored by many speakers, urging that the expenses be borne out of the funds of the Society, inasmuch as all should benefit by the professional material presented. Under this resolution in the winter of 1895 papers were read on the Gas Engine; the Electric Motor in the Machine Shop; the Compound Locomotive; the Waterworks Pumping Problem of New York City; and the Rapid Transit Problem in Large Cities. This last paper was a notable one by Mr. William Barclay Parsons, then recently made chief engineer for the Rapid Transit Commission of New York City, and included the pictures which he had secured of the solutions in various European cities which he had visited during the previous summer with a view to the design of the New York plans. The subway, now so familiar, was then only an engineer's intellectual concept. Mr. E. F. C. Davis, President for that year, replaced the less satisfactory object lens of the Secretary's collection on the projection lantern by a much finer and more costly one, as his gift,

and the lantern was rebuilt in the form which it retained until its usefulness was over because of the longer focal lengths and larger areas of the Engineering Building.

In 1896, 1897 and 1898 both kinds of monthly meetings lapsed. The problem of financing them by voluntary subscriptions was not agreeable to the appointed committee of busy men of affairs; and the Secretary still hesitated to make them a part of his official duty or to entail their operating cost upon the Society treasury, because of an opinion that the non-resident members would entertain rightly or wrongly an impression that the members near headquarters in New York were getting more return from their dues than those at a distance paying at the same uniform rate. The Society must not do anything to give color to a notion that it was a New York City organization local in character, and operated by a ring in the metropolitan district for their own advantage. If such meetings were strictly maintained as local affairs, under a voluntary committee, the Secretary might help in every way, but would not render himself or his administration liable to the charge or thought that some people were getting more than others from his energy and effort.

In 1899, on motion of Mr. Stephen W. Baldwin, the plan of meetings was revived, with a committee of Junior members in charge of it. The philosophy here was threefold: first, to secure the energy of youth for the advancement of the Society; second, to interest men of junior age in the Society and its work, and thus bring them into membership to succeed the older generation; third, to stimulate and train the younger membership in preparing papers and in their discussion. Junior members were in the chair; and pulled the working oar in procuring papers and topics; the Secretary coöperated in correspondence and administration. Members of all grades were invited, and their participation besought because the older ones alone had the knowledge and experience necessary to make discussion valuable. Messrs. F. E.

Frothingham, F. O. Ball, A. L. Rice and Henry C. Meyer, Jr., were particularly active in this work in the spring of 1898 and autumn of 1899, and papers and discussion were presented on the Floating Machine Shop Vulcan in the war of 1898; the Liquefaction of Gases, with particular illustration of the phenomena of liquefied air, then a novelty; the Gas Engine and the Compound Locomotive. In 1900-1901 Mr. John C. Wait presented a most valuable paper on the Laws of Construction Contracts, and Mr. Cornelius Vanderbilt one on Locomotive Fire-Boxes, the latter with special reference to the corrugated furnace type which he was then urging. Others were on Drafting Room and Shop Records and on Superheated Steam. At the close of this series the Junior Committee reported that in its opinion the work of operating such meetings would be better done by a general committee and handed in their resignations. Again followed a lapse in the series of meetings during the winters of 1902 and 1903.

In 1904 Mr. Ambrose Swasey, as President, with characteristic energy revived the winter reunions and secured four splendid gatherings to listen to Dr. Brashear on Evolution of Measurements, to Major Rogers Birnie of the United States Army, on Modern Ordnance, to Julian Kennedy on How Steel Rails are Made, and to W. F. M. Goss on the Modern Locomotive.

In 1905, under the same direction, the reunions were signalized by addresses on: Epochs in Marine Engineering, by Rear-Admiral Melville; Reasons for a Sea Level Canal at Panama, by W. R. Warner and W. H. Burr; Formation of Anchor Ice, by Dr. H. T. Barnes; Diamonds and Diamond Tools, by Gus C. Henning. The latter evening will not be forgotten for its comparisons of admired members of the Society to industrial diamonds, by reason of certain qualities. The next year was that of active preparation for the moving of the Society to the new Engineering Building, and the reorganization and standardization of the office procedure. The Secretary's resignation had also been presented, and the era of new policies of conduct of the Society was about

to be opened when the societies were together under one roof. This period of ebb-tide may therefore be considered to separate the historic series of inter-convention meetings from the current period.

The latter began in 1907, with the decision that such meetings as should be held in the auditoriums of the Society Building during the winter should no longer be meetings of the Society in an exclusive sense, but that pains should be taken to invite and include the members of the other engineering societies. They should furthermore be borne as to their expense by the Society as one of its regular fiscal activities. The first meeting held by any organization in the large auditorium of the Society was that in 1907 where Mr. Fish gave his address on Trade Secrets in their Legal Aspects. General Crozier gave an address on the Mechanical Engineering Problems of the Coast Defence Rifle and its Carriage, and Professor Allen a talk on Use and Danger and Safety in Handling Combustible Hydrocarbons such as Gasolene.

Later, these New York reunions were placed in the hands of a New York Local Committee, and gradually changed from meetings of the Society in New York to meetings of the local groups of New York members and in charge of their executive committee.

In 1909 the question arose of similar meetings in other cities than New York. An identical policy was urged upon Boston and St. Louis and the other cities which took the matter up that these meetings be considered meetings of members of the Society, and that the members of the local society or club in that city should be invited to them as guests and co-workers by right in the discussions and other activities of the meetings. The only restrictions are that the standards and precedents of the Society are to be observed; that the financing of expenses chargeable to the Society in the conduct of such meetings be handled in the annual Society budget and through the Secretary; and that the Executive Committee in control of such meetings be members of the Society. Within these broad lines the meetings are entirely self-

S. T. Wellman

PRESIDENT 1901

OF

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

trolling, and the widest coöperation in papers and ate and along other professional lines is invited and ected, independent of Society membership in other ies or the lack of it. This policy was foreshadowed he presidential address of F. R. Hutton in 1907 emying his recommendations for the future, which by son of its scope and comprehensiveness has been made Appendix to this History.

A further extension of the aforetime activities of the iety will be discussed under affiliation in another pter.

In addition to the local group meetings, the Society cy provides also for meetings on occasion or between ventions of its professional sections. These are made of members and others interested professionally or erwise in some special line and desiring to have ers and discussion relating to it under conditions e favorable than when such papers are offered in wded general sessions at the conventions. This matter also receive further treatment in its own chapter.

CHAPTER XIV

European Trips, Joint Meetings and Engineering Congresses

Mr. Alex. L. Holley, a founder of the Society, had been the American engineer to bring the Bessemer process for making steel to this country. In these relations he had come to know the leaders of the profession in Great Britain and before the Society was organized his brain had been full of plans to bring about international courtesies. The idea as he had it was that the three societies then existing—Civil, Mechanical and Mining Engineers—should create a joint committee to present the matter in England. In the summer of 1882, Mr. Holley and Mr. Charles Macdonald, of such a joint committee, were made a sub-committee to go to England and open up the matter. Mr. Holley's ill-health precluded his acting, but the result of Mr. Macdonald's efforts convinced him that the time was not then ripe for an international meeting or exchanging of official organized courtesies and entertainment. He so reported at the Philadelphia Meeting of 1882 through the President, and the matter dropped.

The next step was a dinner given in London by the president of the Institution of Mechanical Engineers of Great Britain to two members of The American Society of Mechanical Engineers, and in the spring of 1888 a visit to America by that British president. He came in a purely personal way, but after visiting some of the American engineers representative of the Society, among them Major Wm. H. Wiley, its Treasurer, he wrote the following momentous letter:

October 6, 1888

THE PRESIDENT,
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS,

DEAR SIR:

I am authorized to invite your Society to hold a week's meeting in London next year some time in May. We were given to understand that many of the leading American engineers would visit Europe to see the Paris Exhibition of 1889. If your Society should accept the invitation it would be warmly welcomed by the Institution of Civil Engineers, the Iron and Steel Institute and my own Society, viz: The Institution of Mechanical Engineers of England, and others.

Your Treasurer, Mr. Wiley, will more fully explain to you our desire to welcome our brother engineers of America.

I remain, Dear Sirs, Yours faithfully,

(*Signed*) E. N. CARBUTT,
President, Institution Mechanical Engineers.

The Council of the Society at once appointed Messrs. Wiley and Hutton a committee to take action on the question of whether a large and representative party of the Society could go on such a trip, and to keep the British Institution advised of the facts and progress made. The procedure of the Committee was to advise all members by circular letter of the invitation; and by the form of the reply blank to group the answers into three classes: (*a*) those who would go, and could now say so; (*b*) those who hoped to go, and would decide later; (*c*) those who had no expectation of going. These replies surprised the committee in that the affirmative certainties and possibilities reached nearly three hundred.

Meanwhile the then Inman and International Steamship Company, now the American Line, promised the exclusive booking of one of their smaller and slower vessels if the party could fill it. By February 20, 1889, enough had paid their fare to justify the chartering of the ship, and the City of Richmond was assigned to the Society. Its office did all the booking and berthing, and the steamship company said that it was then unique in their experience to have a group of individuals take a whole ship and fill it with their friends.

History was also being made in London, and under

the wise guidance of Mr. James Dredge, Honorary Member of the Society, the original scope of the first invitation was broadened to include the three other engineering societies; and the English host became the Institution of Civil Engineers of Great Britain, inclusive on that side of all subdivisions of engineers. In March the party was so far organized that the Society paid $18,145 to the company for the purchased tickets and the party numbered 166. There was then a waiting list, some of whom were turned over to the cabin list of the S. S. City of New York.

Just before the party embarked, the following letter was sent to every one by Mr. Forrest, Secretary of the Institution of Civil Engineers:

The Institution of Civil Engineers,
25 Great George Street, Westminster, S. S.

May 4, 1889.

DEAR SIR:

I am directed by the President, Council and other members of this Institution to request the honor of your company at dinner on Thursday, the 13th of June, at 6:30 for 7 p.m. precisely. The dinner is to be given in the Guild Hall of the City of London, which has been kindly placed at the disposal of the Institution, by the express sanction of the Right Hon., the Lord Mayor, Aldermen and Commons of the City of London in Common Council assembled, for the purpose of entertaining the members of the different American Engineering Societies who will then be in London.

An early answer will oblige. Evening dress will be observed. In case this invitation is accepted, a formal card will await your arrival in this country.

I am,
Yours faithfully,
(*Signed*) JAMES FORREST,
Secretary.

It was appreciated at the time that a very unusual courtesy was thus extended, but its full significance was not realized until the party reached London. It had been found advisable to retard the arrival of the party at that city until the close of the Whitsuntide holidays, which are celebrated in England by the suspension of work in many manufacturing establishments, and therefore it

was suggested that the few days between the arrival of the steamer and the end of those holidays should be spent by the party in trips through the rural and historic interests of England. The London and Northwestern Railway, which had already tendered free transportation from Liverpool to London to the members of the Engineering Societies, issued a circular giving a choice of tours in England, and a similar circular giving the tours over the Midland Railway was furnished through Cook's Tourist Agency. The members were in part requested to make their choice of these tours before sailing, but a decision was not reached by many until their arrival at Queenstown.

Just before the City of Richmond sailed, the Council of this Society, in conference with representatives of the Mining and Civil Engineers, arranged for the formation of a Joint Executive Committee of the three societies, which should be the channel for the hospitalities shown by English hosts to the party at large. The organization of this committee, however, was not perfected until the party in the two ships reached Liverpool and came to an agreement there.

The steamer City of Richmond, with its full complement of passengers berthed in the first and second cabin, the latter fitted up and treated as first, sailed at 3 p.m., Saturday, May 25; the City of New York with the overflow party, and also those connected with the party who booked through the American Society of Civil Engineers, sailed May 29, the following Wednesday. After the party acquired its "sea legs" there were the usual games and sports, including an initiation into the order of Neptune.

The first steamer reached the Mersey on Tuesday, June 4th, but at Queenstown the representatives of the English hosts had boarded the steamer the day before.

A full report of this trip and its courtesies, English, French and German, was prepared by the Secretary of the Society and may be studied by those interested as paper No. 336 in Volume 10 of the Transactions, page

851. For a summary account of the busy weeks of the visit, the report of President Henry R. Towne in his presidential address in 1889[1] will here be quoted from:

The voyage of the City of Richmond is a memory which all who had the privilege of taking part in it will ever recall with the greatest pleasure. It was harmonious from beginning to end. A committee was organized on the second day after sailing and had sessions every day of the voyage—indeed long sessions, as there was much work to be done in preparation for the affairs to be carried out on the other side, more than any of us had realized. The members of the party, both ladies and gentlemen, soon became well acquainted, and the voyage came to resemble a large yachting party rather than an ordinary trip across the Atlantic.

Liverpool was reached on Tuesday, June 4, and before foot was set on English soil the party received a foretaste of English hospitality. There came out to meet the ship in the Mersey a tender carrying a committee of the local reception committee at Liverpool headed by Mr. Alfred Holt, their chairman (reputed to be the largest individual shipowner in the world), Mr. Daglish, Mr. West, and a number of other gentlemen. They boarded the ship and greeted all with words of hearty welcome, took charge of the landing, facilitating the passage of the customs authorities, and from that time until all left Liverpool they were ceaseless in their endeavors for everyone's comfort and enjoyment.

The City of New York arrived two days later, in the early morning, and with that day began the regular excursions which had been planned for the entertainment of the guests. The hosts in England were the Institution of Civil Engineers. The individual members taking part in the entertainment, most of whom came expressly to Liverpool to greet the party, were the president, Sir John Coode, Sir Frederick Bramwell, Sir Lothian Bell, Sir James Allport, Mr. Adamson, Sir Henry Bessemer,

[1]Vol. 11, No. 358.

Sir Geo. Bruce, Mr. Cowper, and many others whom there is not space available to name; but among them all no name made itself more familiar, or will ever be more warmly remembered, than that of the Secretary, Mr. James Forrest.

It became necessary for the party, comprising, as it did, members of this Society, of the Civil Engineers, and the Mining Engineers, together with a few members of the Electrical Engineers, to create some kind of an organization which should represent the united party during its travels in Europe. A joint committee was appointed to accomplish this purpose, and the result of their labors was the selection and recommendation of the following list of officers, who were unanimously elected by the joint party: Mr. Whittemore as honorary chairman, Mr. Henry R. Towne as chairman; and as officers or associates: Mr. Chanute, Mr. Woodbury, Mr. Clarke, Professor Hutton, Mr. Wiley, Mr. Dempster, Mr. Kent, Mr. Archbald, Mr. Baldwin, Mr. Fisher, Mr. Hawkins, Doctor Torrey, Mr. Bond, Mr. Forsyth, Mr. Oberlin Smith, and Mr. D'Invilliers. The treasurer was Mr. Hunt; the honorary secretary, Mr. Emery; the secretary, Mr. Kirchhoff. It is an evidence of the cleverness with which the nominating committee did its work, that out of the 21 names above, there are 13 who are members of the Society of Civil Engineers, 13 who are members of the Society of Mechanical Engineers, and 9 who are members of the Institute of Mining Engineers. The joint committee worked acceptably and accomplished its work satisfactorily, although the work proved to be much larger than would have been appreciated beforehand and demanded a great deal of time and care.

The first full experience of English hospitality came at Liverpool in the form of a dinner given by Sir John Coode at Liverpool, the evening after the City of New York arrived, to a few of the officers of the joint party, followed during the evening by a conversazione at the Town Hall, given by the Mayor, Mr. Cookson, and attended by the whole of the party and a great number of

ladies and gentlemen from Liverpool—a most brilliant assemblage.

The next morning the visitors were divided into two parties, one going to the Mersey Docks under the guidance of officers of the Dock Estate, who have charge of the most vast and expensive system of dock construction in the world, the extent of which is simply marvelous, and to Americans utterly unknown. The tides in Liverpool, and indeed all around the English coasts, average nearly thirty feet in height, entirely precluding the use of a wharf system such as there is in New York, and necessitating the entry of all vessels into docks closed by gates which are opened only for about an hour at high water.

The other party went through the Mersey Tunnel, a great work connecting Liverpool with Birkenhead, which had been recently completed under the guidance of Mr. Rowlandson, the engineer, and then to the Laird shipyards, where 576 vessels have been built within the last 30 years. They were entertained at a magnificent luncheon served in a tent on Mr. Laird's grounds, and then visited one of the great steamers then being built for the Hamburg line—a sister ship of the Augusta Victoria—and finally were brought back to Liverpool, arriving at the great landing stage which is used for tenders and ferryboats to deliver their passengers upon, said to be the greatest floating structure in the world, and having a total length of 2063 feet.

The next day the party divided again; one section going to Crewe, the location of the great constructive works of the London and Northwestern system, corresponding to Altoona on the Pennsylvania system, where they make steel rails, build locomotives, and conduct most of the mechanical operations of the line. The extent of those works is probably familiar to all, but it is interesting to note that the capital of that great corporation is $528,000,000, with an annual revenue of $51,000,000, and with 60,000 employees. It is also interesting to note that, even in that snug little island, one railway

Edwin Reynolds

PAST PRESIDENT

OF

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

system can control and operate 2500 miles of line. The Crewe works cover 116 acres of land, of which 36 are under roof.

The other section of the party on that day went to Horwich, on the line of the Lancashire and Yorkshire Railway, and inspected a similar plant there, but one even more interesting than that at Crewe in this respect —that while Crewe has grown up almost from the commencement of railway operations in England and is to some extent a patchwork, although a vast and most highly organized one, the new plant of the Lancashire and Yorkshire Railway at Horwich is entirely new, has been built within the last three years, was laid out and organized by commencing with a clean sheet of paper and an unbroken piece of ground admirably chosen, and has a series of vast buildings designed harmoniously with reference to their intended uses and in the light of the best and latest modern experience, including that of Crewe. The mechanical engineer of that system, Mr. Aspinall,[1] who has charge of the Horwich works, although a younger man than Mr. Webb, the presiding genius at Crewe, is his equal apparently in talent and organizing capacity, and, working as he does with this newer and more modern plant, is making a record which certainly will be a good second to that of Crewe. In the manufacturing department, where they make the smaller products, such for example as their switch and signal apparatus, Mr. Aspinall has introduced a great deal of American machinery and American methods of manufacture, and it seemed to the writer that the place compared favorably with any private establishment ever visited. These works cover 85 acres of ground, of which 13½ acres are under roof.

In the evening of that day the two parties united at Manchester, where a reception and banquet were

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[1]It is interesting to note that this gentleman was the President of the Institution of Mechanical Engineers on the occasion of the second American visit twenty-one years later in 1910, and was President of the Railway System. He is an Honorary Member of the A.S.M.E.

tendered at the Town Hall, presided over by the Mayor of Manchester and attended by a great many of the prominent citizens. It was a delightful occasion and even more elaborate than the reception at Liverpool.

The next day the party visited the great ship canal between Manchester and Liverpool, 35 miles in length, the contract price for which was $28,000,000, and on which 15,000 men were employed.

The next week being the Whitsuntide Holiday or recess, was utilized for excursions not connected with the engineering part of our visit. The party broke up into two groups, one going through North Wales, the other through the Midland counties, reuniting in London. It is fitting to remark at this place that all through the trip the courtesies extended to the American engineers by English railway officials were marked and generous to the greatest extent. The London and Northwestern system gave free transportation from Liverpool to London, including a return privilege at whatever time the holder of the ticket desired, and other systems followed later when the party had reached London and made excursions from that point.

On Thursday, the 13th of June, those wonderful eight days of hospitality in London began with a choral service in Westminster Abbey, conducted by Dean Bradley, who gave an address of welcome to the American party; then a brief visit to the Houses of Parliament and in the afternoon a reception by the Institution of Civil Engineers. The latter was opened by an address of welcome from Sir John Coode, the president, the words of which have been beautifully illuminated and framed and presented to this Society, and also to the sister societies here, by the Institution of Civil Engineers, and a copy hung in the new rooms. The party was especially fortunate in having with it at that time one of the Society's oldest and most honored members, to whom was committed the duty of replying to the address of welcome from Sir John Coode, and who did it in a manner which more than fulfilled our expectations;

Professor Thurston's admirable address on that occasion was one for which all of the party felt grateful and of which all were proud.

In the evening of that day a dinner was given to the party by the Institution of Civil Engineers in the old and historic Guildhall of London, a building which we were told had never before within memory been used for any purpose not directly connected with the civic hospitality of the City of London. It was a great compliment. The dinner was elegant beyond easy expression and was dignified and notable in every particular. Among the guests of the occasion were the American Minister, Mr. Robert Lincoln, Sir Edward Thornton, Lord Armstrong, Archdeacon Farrar, Dean Bradley, Sir Henry Bessemer, Sir William Thompson, Mr. Latimer Clarke, Sir James Douglass, Mr. Gilchrist, Mr. Mather, Sir E. J. Reed, Professor Unwin, and a great many others whose names are familiar on this side of the Atlantic as well as on the other. One of the pleasing incidents of the evening was the address given by Mr. Lincoln, which was worthy of the occasion and able throughout, and at the close of which he gave utterance to a sentiment especially complimentary to the engineers and typical of the character of the times and of the change in sentiment which is taking place in the world. Addressing the united party of engineers, English and American, he said that "engineers throughout the world are doing more than any other agency at the present time to bring about the brotherhood of the nations, and to render superfluous such offices as that which I now have the honor of holding."

The next day was devoted to visits to the docks and gas works, to drainage works, to the great Tower bridge across the Thames, to Greenwich, to the Yarrow shipyard, to various engineering works, and by a fraction of the party, to a visit to Lambeth Palace, where the Archbishop of Canterbury received the guests and conducted them personally through the edifice. On the following day, June 15, the party was taken by special train over the Great Western Railway to Windsor, where the Queen

had given special permission for our party to go through the palace, and to see not only those parts which are usually open to the public but also the private apartments, which were exceedingly interesting. A small fraction of the party went on that day to the grounds of Mr. Boulton, at Totteridge, where they witnessed a remarkable presentation of the Midsummer Night's Dream, given in the open air. This was the day on which the author joined the party. The evening of the day concluded with a reception tendered to the party by Lord Brassey at his beautiful house in London, where all saw many of the wonderful curios collected by himself and the late Lady Brassey during their yachting tours around the world. The following day was a Sunday, and on the next day, Monday, the party went in the morning to see the Royal Palaces in London—St. James and Buckingham. It was one of the coincidences of this visit that the visitors were greeted there with the strains of Yankee Doodle and Hail Columbia, the day being, as one of the party recalled, the anniversary of the battle of Bunker Hill. On the afternoon of this day Lady Burdett-Coutts gave a garden party and reception at her London residence. The following day was devoted to a trip to water works and pumping plants, to Hampton Court Palace and Bushy Park, and the day following to similar visits to railway stations and the great plant of the London Electric Supply Corporation, the ladies going to the flower show of the Royal Botanic Society; and a party of the members, unfortunately a small one, able to avail themselves of the privilege, spent the day in a visit to the residence of Professor Tyndall, who had invited as large a party as his house was capable of entertaining. Those who went received at his hands a most cordial and delightful reception, and it is pleasing to mention a fact which was also learned from those who were fortunate enough to be there, that the response made over the luncheon table to the remarks of Professor Tyndall by the honorary chairman, Mr. Whittemore, were eloquent and beautifully fitting to the occasion. Other hospitalities

James M Dodge

PRESIDENT 1903

OF

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e extended to individual members of the party on oc-
ons which did not admit of their being made general.
or two of the London clubs gave admission to the
nbers, as had also been done in Liverpool, and in
ry way the hospitality of the English cousins was
lial beyond any mere words of expression. All of
party, in undergoing these experiences, realized that
le there was of course a large amount of personal
pitality underlying it, and still more of professional
ome, the true motive prompting these manifestations
n the English friends was that of deep and sincere
liality towards America and Americans. This was
le evident to us throughout the whole of the English
erience, and it struck many that the feeling of *kinship*
he part of the English toward the Americans is even
ater at the present time than the corresponding feel-
which they entertain toward the English. Americans
back to England as the mother country and as such
e for it the warmest feeling of affection, but on the
t of Englishmen there can be of course no correspond-
feeling toward this country. The fact of the kinship
the two peoples, however, is more real to English-
a at the present time than it is even to the Americans,
they realize more clearly the fact that together both
stitute the two branches of the great Anglo-Saxon,
glish-speaking race, which has accomplished so much
he industrial world.

On June 20 English friends again put the party on a
gnificent special train, and many of them accompanied
n on it via the London, Chatham and Dover Railway,
Dover, and from there by a special steamer across the
glish Channel to Calais. The crossing was on a beauti-
sunny day, with bright sparkling water, and with no
se for discomfort.

Upon landing on French soil there was again an im-
liate greeting of hospitality from the new hosts,
resented by members of the French Society of Civil
gineers, who had come from Paris for the purpose.

Again the visitors were placed on a special train, tendered by the Northern Railway of France, and taken to St. Omer and Fontinettes, to see a new and unusual canal lift which had just been completed there, and thence on to Paris. The hosts during the French visit were composed almost entirely of members of the French Society of Civil Engineers, headed by M. Eiffel, the president that year, M. Brull, a past-president, M. Contamin, principal engineer of the wonderful machinery palace at the exhibition, which was awarded the prize of 20,000 fr. tendered by an American for that feature of the exhibition which, in the opinion of a special committee appointed to make the award, represented the highest accomplishment and greatest usefulness. The committee's award was to the designers and builders of the wonderful machinery hall, a building having a span of 330 ft. and a length of about 1500 ft. The other members of the reception committee were M. Jousselin, M. Banderali, M. Pontzen, M. Alphand, who is the director-general of the Exhibition, M. Garnier, the world-famous architect, M. Haton de la Goupillière, who is the head of the Ecole des Mines in Paris, M. Gottschalk, M. Charton, and many others. A few members of the joint committee were privileged to be the guests at a small but most delightful dinner given at one of the restaurants in the exhibition grounds by a gentleman whose name has been too little associated with this wonderful excursion, Mr. James Dredge, of London, the editor of the journal *Engineering*, and one of the leading representatives of the English section of the late Paris Exhibition. All of the societies were indebted more to Mr. Dredge than to any other one person for inaugurating the excursion, for enlisting English and French interest in it, and for contributing to the success of the whole undertaking. One member of the party, the treasurer of this Society, Mr. Wiley, knows the facts, but they are not yet fully appreciated even by the members of the party abroad; and no amount of thanks which can be expressed or tendered

to Mr. Dredge would cancel the obligation which is owed to him.

On Saturday, the 22d of June, the party went to the exhibition under the conduct of members of the French Society, and were taken through a portion of it, and then to the Eiffel Tower, after ascending which they were entertained at a luncheon on the lower platform of the Tower, presided over by M. Eiffel, the president of the French Society, and attended very numerously by members of the French Society and guests, including Mr. Whitelaw Reid, the American Minister, and General Franklin, American commissioner to the exhibition.

The stay in Paris included many other visits—to the great sewers, to the Gobelin Tapestry Works, to M. Pasteur's laboratory, to the Ecole des Mines, to the great omnibus and cab companies, to the sewerage and pumping stations, to the Sèvres Porcelain Works, and so on. The social features of the entertainment in Paris included, besides what has been already mentioned, receptions to a part or the whole of the joint party by President Carnot, by the Prefect of the Seine, and by the Municipal Council. It was a pleasant feature of the reception at the latter place that one of the speakers on the American side, Professor de Garay of the City of Mexico, a member of the American Society of Civil Engineers and an accomplished scientist and gentleman, responded most eloquently in the French language, as was done by other members of the party on other occasions. The Institution of Mechanical Engineers, which had been the first to extend an invitation to visit England, happened to have their summer meeting in Paris just at the close of the stay there, and extended to those of the members who remained an invitation to their dinner and to their sessions, so that English hospitality followed the party even on French soil. Then came the disbanding of the party, some returning home, others going South, and a considerable number going into Germany, where they were afterward heard from as receiving hospitality even more overwhelming than that which had greeted them either

in England or in France. Still others came back to London, and a very small number, seven only being obtainable, were privileged to take part in a small but unique entertainment given by Mr. Dredge, again the host, in order, as he supposed, to enable a selected group to present a handsome silver loving cup to Mr. James Forrest, as a token of appreciation of the members of the party to him for what he had done for them during the visit abroad. The committee having the matter in charge, however, appreciated that Mr. Dredge was entitled to a loving cup as well as Mr. Forrest, and two cups were prepared, each suitably inscribed. Each of the two recipients knew that the other was to be presented with a cup, but neither knew that he was to receive one himself, and there was a very pleasant and amusing dénouement when the second cup came out.

On July 22 a number of the party again came together and for the last time accepted the hospitality of the Midland Railroad and a special car to Derby, where they were the guests of Mr. John Noble, the general manager of the company, and several of their directors. After a handsome luncheon in the director's room a visit was made to their works, which are similar to those at Crewe, although not quite so large, and the day ended for many on reaching Liverpool in preparation for the homeward voyage. The party which reassembled in this way at Liverpool, numbering more than fifty, came home on the City of Richmond, together with those from Paris, reaching New York, just three minutes too late to break the ocean record. The rest of the party came home in scattering groups but more than fifty came home on the 25th of August, to be the recipients in New York City, of hospitalities organized at the hands of Mr. J. F. Holloway and other friends at the Engineers' Club in 29th Street. A handsome dinner was given to the returning guests, a proceeding likened by a witty speaker to the heaping of coals of fire on their heads, since the hosts were those who had not been able to participate in the sessions which the guests had just been enjoying and of

Ambrose Swasey

PRESIDENT 1904

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they spoke in such enthusiastic terms. So ended
ɔerience remarkable in every sense of the word and
ut precedent, and one which will ever be a delightful
ry to those whose privilege it was to take part in it.
ιere were a number of individual experiences not
ɔle to every member of the party and of which a
ɔcount of the European visit must take cognizance.
visit to the Pasteur Institute of Paris for example,
the privilege of one of the members and a Past-
lent of the Society to stand between M. Eiffel, de-
of the great tower which bears his name, and M.
Pasteur and witness the innoculation by the dis-
shed surgeons of a dozen or more patients who had
ɔrought in. Each one was punctured in a little spot
side above the hip and the antitoxin administered,
ıole operation taking but a few minutes, but it was
distinct novelty among the great benefactions.
ιother most interesting occurrence was the German
of that year, with headquarters at Düsseldorf.
were daily trips to mines and mills and nightly
functions. Among these was a grand ball at one
hotels, a supper and a dance in the Zoological
ns, and an evening in the beautiful gardens where
rchestra is the successor of that conducted by
ɔlssohn years ago. The trip to Cologne and Coblenz
ıated the German experience of that year. The
reached Coblenz about noon. This was then the
nce of the widowed Empress Augusta, grand-
r of the Kaiser on the throne in 1913, who then
in the dowager palace. The whole party of some
were tendered a luncheon in the beautiful palace
ns and afterwards a select three, of which Past-
lent Oberlin Smith was one, were invited to visit
mpress in her private apartments, her health not
robust enough to permit the approach of the entire
At high noon, evening garments were donned and
mith received a huge bouquet which appeared to
s he describes it, about the size of an umbrella, for
ıtation to the hostess. She spoke excellent English

reau, with railroad and industrial information for the use of any visiting engineers who might pass through or stop in New York. Dr. Chas. H. Deghuee was secured as linguist and the Society was glad to furnish this effective service during the Exposition period.

But when the French Society of Civil Engineers decided to come in a body with President and Secretary and some features of organization, the energy and enthusiasm of what the party four years ago had agreed to designate as "Eighty-niners" was expended on them. A committee was formed, of which Stephen W. Baldwin, the Secretary of the Society and Mr. H. H. Suplee were the working factors. The Marquis de Chasseloup Loubat, a member of the French Commission to the Exposition, had been very active in the French society of which he was a member, and a party of 46 with the President and Secretary of the Society, had arranged to embark together.

The program for their entertainment was as follows:

GENERAL PROGRAM OF THE VISIT OF THE FRENCH ENGINEERS TO AMERICA AS GUESTS OF THE "EIGHTY-NINERS"

Saturday, August 26	Leave Havre on La Champagne
Sunday, September 3	Arrive at Morton Street Pier, New York
September 3 to September 7	Guests of New York welcome company
Monday	Bridges and park drive
Tuesday	The city
Wednesday	The river and harbor
Thursday	The respite for business
Friday, September 8	Special complimentary train to Niagara
Saturday, September 9	At Niagara. Leave by special train for Chicago
September 10 to 19	In Chicago (Auditorium)
Tueday, September 19	Leave for St. Louis
Wednesday, September 20	In St. Louis and leave for Pittsburg
September 22, 23	In Pittsburg (Monongahela)
Sunday, September 24	En route for Washington, D. C.
Monday, September 25	In Washington (Ebbitt)
September 26, 27	In Philadelphia (Continental)
Thursday, September 28	Arrive in New York
Friday, September 29	Final day in New York City
Saturday, September 30 to Sunday, October 8	En route for Havre

The entertainment in New York had been begun by a boarding of the S. S. La Champagne at Quarantine by

Messrs. Baldwin and Hutton early Sunday morning. Luncheon on Monday at the Engineers' Club in the 29th Street home preceded a drive in carriages through the city parks. The next day embraced a run on the elevated railway system, a luncheon at the Café Savarin, with speeches by Colonel Prout and others, and thence to the Brooklyn Bridge and the Grand Central terminal; the third day a harbor trip with a luncheon on the Fall River steamer, *Puritan.* The party was then dispatched by special train to Niagara, to Detroit and to Chicago. The expenses of this entertainment were borne by subscription, so that it was not an official matter of the Society, and yet was operated altogether as though it were.

The next international interchange was a repetition of the experiences of 1889, albeit on a smaller scale. In view of the fact that a number of members of The American Society of Mechanical Engineers were expected to visit Europe during the summer of 1900, several invitations were tendered by European societies, and it was at first thought that a party of members might be formed to cross in the same steamship, in a manner similar to that which had been found so successful in 1889. A thorough canvass of the membership, however, showed that it was impracticable to arrange a date which would be acceptable to all, hence it was decided to allow the various members to make their own plans for crossing, and arrange for a general gathering on the other side.

The following committee was appointed by the Council to represent the Society at the various functions abroad, and to conduct the necessary organization of the members who might visit Europe: Charles H. Morgan, President, Jesse M. Smith, Vice-President, William H. Wiley, Treasurer, James Dredge, Honorary Member, H. H. Suplee, Member of Council. Mr. Suplee was appointed Secretary of the Committee.

Mr. Suplee sailed in April, establishing his headquarters at the offices of the *Engineering Magazine,* 222-

225 Strand, London, the various members being instructed to report to him upon arrival in London.

Invitations had been received from the Institution of Mechanical Engineers and from the Institution of Civil Engineers to attend their respective conventions in London, and also from the Société des Ingénieurs Civils de France to send delegates to attend its meetings in Paris.

The Paris meetings were the first in point of time, and the Council had appointed as delegates the members of the committee above named. But two members of that committee were able to attend, Messrs. Morgan and Suplee, as Messrs. Smith and Wiley had not yet reached Europe, and Mr. Dredge found it impracticable to leave London at that time.

The Paris meetings, which took place from June 15 to June 20, were naturally closely bound up with the Exposition, but included also numerous social and special functions. On June 15 there was given a brilliant conversazione at the fine new house of the Société in the Rue Blanche, at which the delegates were formally received and presented to the president, M. Canet, at the same time renewing many pleasant acquaintances made among members of the Société who had visited the United States in 1893, as well as with the hosts of 1889. On June 18 a musical and literary soirée was given at the house of the Société, the entertainment including instrumental and vocal selections and recitations by artists of the Opéra, the Comédie Francaise, and other noted companies. This brilliant function, to which ladies were also invited, was especially notable.

Numerous specially conducted visits to various sections of the Exposition were provided, and the house of the Société was thrown open to the delegates, and the valuable assistance of the *secrétaire administratif*, M. Armand de Dax and his staff placed at their service to enable various points of interest in Paris and at the Exposition to be visited to advantage.

Among the special social functions of the week must

be mentioned the reception given to the visiting delegates by M. and Mme. Canet, on June 16, at their magnificent residence in the Avenue Henri Martin.

The convention was closed with a banquet at the Hotel Continental on the evening of June 20, which was largely attended.

Prior to the meetings of the Institution of Mechanical Engineers, which took place June 27 to 29, inclusive, plans were made for a general gathering of the members of The American Society of Mechanical Engineers, a number of whom had arrived in London, and had communicated with the Secretary of the Executive Committee.

The Secretary had already been in most pleasant communication with Mr. Edgar Worthington, the Secretary of the Institution of Mechanical Engineers, through whom the Council of the Institution most kindly placed the hall in the house of the Institution, at Storey's Gate, St. James's Park, at the disposition of the committee.

A meeting of a number of the members of the Society, together with the Executive Committee, was held at the house of the Institution of Mechanical Engineers on June 25, at which the various invitations of the Institution were announced and the necessary communications made. At all of the meetings of the Institution of Mechanical Engineers the fact was emphasized that the members of The American Society of Mechanical Engineers were especial participants and honored guests. At the opening ceremonies of the convention prominent places were reserved for the Executive Committee and visiting members, and the President, Mr. Charles H. Morgan, was called upon to speak in response to words of greeting from Mr. E. Windsor Richards, who, in the absence of Sir William H. White, presided.

From a technical point of view, the most important visit of these meetings was that to the works of Messrs. Willans & Robinson, at Rugby, on June 29. A special train on the London and Northwestern Railway carried the members of the two societies to Rugby, the train de-

livering the party directly at the works, where, under the courteous and hospitable guidance of Mr. Mark Robinson, Captain Sankey, Mr. Lazenby, and others, this fine works, admittedly one of the most modern in arrangement in England, was thoroughly inspected.

Other parties were made for boat trips up the Thames to Staines, and down the river to the docks, and all the visitors expressed themselves as most highly appreciative of the privileges which had been offered them.

On the evening of Wednesday, June 27, occurred the banquet at the Hotel Cecil, upon which occasion the American visitors were highly honored. Mr. E. Windsor Richards ably filled the chair, supported on the right by the American Ambassador, Hon. Joseph H. Choate, and on the left by the Right Hon. Lord Alverstone, Master of the Rolls, by whose side was placed Mr. Charles H. Morgan, President of The American Society of Mechanical Engineers. Other members of the Executive Committee and of the Society were similarly placed by the side of distinguished British hosts. The occasion was a memorable one in many ways, and undoubtedly served to unite more closely than ever the professional and personal ties existing between the two societies.

Too much cannot be said of the manner in which the Secretary of the Institution of Mechanical Engineers, Mr. Edgar Worthington, exerted himself to render all the events most enjoyable and agreeable to the American visitors, and in this he was most ably seconded by the members of the Reception Committee, headed by Mr. William M. Maw, its chairman, since elected President of the Institution, and by many individual members of the Institution.

The meetings of the Institution of Civil Engineers took place from July 2 to July 6, inclusive, and prior to that date the Secretary of the Executive Committee had been in communication with the Secretary of the Institution, Dr. J. H. T. Tudsbery, whose courteous services were most gratefully acknowledged. Invitations for all the functions of the convention were placed in the hands

John R Freeman

PRESIDENT 1905

OF

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

ie Executive Committee with care and promptness, every possible facility afforded for their distribution. The opening meeting was held on the afternoon of 2, at the house of the Institution in Great George et, Westminster, where the American visitors were ted by an address of welcome by the President, Sir glas Fox. At this meeting, not only members of The rican Society of Mechanical Engineers were present, ilso members of the American Society of Civil Engis, the American Institute of Mining Engineers, and American Institute of Electrical Engineers.

ir Douglas Fox said, in part:

his Institution is the home of the Parent Society of British Engineers. cosmopolitan in this sense, that it includes every class of Civilian eer, and that is the meaning from our point of view of the words l Engineer.'' Now, the great advantage of that for you and for us Council of this Institution is, that I have this afternoon the honor ıng supported on this platform by representatives not only my own il, but of that of the Mechanical Engineers who have been your kind during the last week, of the Electrical Engineers, of the Naval Archiand of the Iron and Steel Institute. I have only got to mention those to you to show you that on this occasion I represent a very great not only in this country, but throughout the world. There are men vho have made their mark, as there are men on the other side, facing ho have made a very great mark upon the world; and it is good for come and see one another face to face on an occasion like this. Then, e other hand, because we are cosmopolitan, we have been able to l our invitation not merely to the Society of Civil Engineers of ica, of which some of us are very proud to be members, but also to ers of the other engineering societies, the Mechanical Engineers, the g Engineers, the Electrical Engineers, and the Naval Architects of nited States, and we hope that all those bodies are more or less reprel amongst us this afternoon.

Responses were made by Col. H. S. Haines, member he Council of The American Society of Mechanical ineers, and by Mr. Jesse M. Smith, Vice-President of American Society of Mechanical Engineers, after h a general conversazione followed.

On the following day occurred the most notable event he convention, a trip to Windsor Castle, where by ial permission of her Majesty, Queen Victoria, private apartments of the Royal residence were wn open to the visitors, after which a luncheon was

served in the conservatory, the Institution of Civil Engineers and its American guests being the guests of the Queen.

The party was then gathered on the lawn, to be received by Her Majesty, who drove before them, and caused to be presented to her by Sir Douglas Fox, the President of the Institution of Civil Engineers: Mr. John J. Wallace, President of the American Society of Civil Engineers, and Mrs. Wallace; Mr. Charles H. Morgan, President of The American Society of Mechanical Engineers, and Mrs. Morgan; and Mr. Charles Hawksley, of the Institution of Civil Engineers, and Mrs. Hawksley. The Queen spoke a few words of welcome, saying: "I am very glad to see you here, and that you have had such a beautiful day," and then drove slowly down the line, bowing a greeting to the entire party.

The Fourth of July was left without special assignment, in order that the Americans might celebrate their national holiday according to their own plans, and many most enjoyable reunions took place during the day and evening.

On the evening of July 5 occurred the reception by the President and Council of the Institution of Civil Engineers, at the Guildhall, where a large attendance of ladies and gentlemen made the occasion memorable.

On July 6 there was an excursion to Warwick and to Stratford-on-Avon, a special train taking the party first to Warwick; there they were welcomed by the Earl and Countess of Warwick at the Castle, and by them shown through the stately buildings so rich in historical reminiscences and relics, after which the whole party was entertained in a large marquee set up for the purpose in Warwick Park. A hurried run to Stratford followed and the visitors were brought back by their special train to London.

An invitation had been extended through Mr. H. F. L. Orcutt at the meeting on June 25 that the Americans should visit Berlin as guests of Messrs. Ludwig, Loewe and Company. Special trains and entertainment at their

hotels and many other distinguished courtesies were shown to those of the party who could accept this invitation, and a banquet of unusual splendor and visits to the shops of Loewe and Company were features of this part of the excursion.

By direction of the Council illuminated addresses of salutation and recognition were prepared in its name and forwarded by the Committee to those whom they desired to honor. They will be found reproduced by photography in the report of Mr. Suplee presented in Volume 22 of the Transactions, as No. 912.

It would not be profitable to compare the trip of 1900 with that of 1889. The meetings of 1900 included events which were unique in themselves. The day at Windsor, with the reception by Queen Victoria, was, socially speaking, above anything occurring in 1889, while the active entrance of American competition into European engineering industries gave a new meaning to all that was seen and heard. Both occasions were memorable; both will long be remembered by those who were so fortunate as to participate in them.

The following list of members of The American Society of Mechanical Engineers participating in the European events of 1900 does not profess to be complete, owing to the neglect of some to register at the office of the Secretary of the Executive Committee. Every attempt has been made to amplify it, and under the circumstances it may be considered as reasonably correct and full:

Almond, T. B.
Archer, E. R.
Baker, C. W.
Barnaby, C. W.
Braine, B. G.
Breckenridge, L. P.
Brown, A. T.
Bullard, E. P.
Carroll, L. D.
Colby, A. L.
Cooke, H.
Dicke, G. W.
Doran, W. S.
Dredge, J.
Fisher, C.
Flad, E.
Freeland, F. T.
Goss, E. O.
Greenwood, P. F.
Haines, H. S.
Hayward, H. S.
Henning, G. C.
Honiss, W. H.
Howe, H. M.
Hunt, R. W.
Hunter, G. E.
Jones, W.
Kuwada, Gompei
Loss, H. V.
Low, F. R.
Melvin, D. N.
Miller, Fred J.
Miller, S.
Norbom, J. O.
Parks, E. H.
Parsons, H. deB.
Reed, W. E.
Robinson, A. W.
Sancton, E. K.

SHELDON, F. P.	SUPLEE, H. H.	WEBSTER, W. R.
SMITH, JESSE M.	SWASEY, A.	WHEELER, H. S.
SMITH, OBERLIN	THOMAS, C. W.	WHEELOCK, J.
SPANGLER, H. W.	THOMSON, J.	WILEY, W. H.
STILES, N. C.	WARD, C.	WOOD, K.

The next international event was the joint meeting of the British Institution of Mechanical Engineers with The American Society of Mechanical Engineers in Chicago in June 1904. Besides the formal routine of the Society convention elsewhere reported, the Society arranged that in each industrial city of importance where its members were to be found, there should be a representative or a committee to whom the visiting Englishmen might address themselves for guidance and for furtherance of their purposes while in that city. This plan worked very much to the advantage of the visitors, who were accredited from New York to the appointed persons, and for whom information concerning the industries and transportation by rail was supplied from headquarters.

After the meeting had adjourned, those who so desired were conveyed to the Exposition in St. Louis, and were thence allowed to depart for home, either directly or after further travel as they might desire. At this convention the plan of registration by slips and carbon duplicates was first introduced as devised by Mr. Louis A. Gillet, assistant to the Secretary.

The next interchange was the joint meeting in Birmingham, England, in 1910, where the American Society were guests of the British Institution of Mechanical Engineers. The party was a result of a conference in the Spring of 1909 in America, in which Sir Robert Hadfield of the Council of the Institution was its mouthpiece. On September 17 followed the official invitation and an Executive Committee was formed to arrange details. Reservations were made on the White Star steamer Celtic for 144 members and guests, sailing on July 16, while many others were to join in England. The sea trip was remarkable in many ways through the efforts of a

committee of which Mr. George M. Brill was the leading spirit, to promote acquaintance and relieve any tedium. On Monday evening the officers of the ship and of the Society held a reception with dancing. On Tuesday Worcester R. Warner gave a lecture on What the Astronomers are Doing; on Wednesday there was a musicale including recitations; on Thursday John R. Freeman gave an address on the Panama Canal; on Friday was a dance; and on Saturday the award of prizes in the games of sport and chance. A presentation of souvenirs to captain and chief engineer was a feature of the evening.

The tender in the Mersey brought a splendid delegation of the English hosts on board who welcomed the party. A special train from Liverpool was met by motor busses in Birmingham, and the meeting was begun. Preliminary courtesies to officers of the Society by the President of the Institution, Mr. J. A. F. Aspinall, signalized Monday July 24, and on Tuesday the joint meeting opened. In the afternoon many excursions were arranged in and around Birmingham; a number visited historic Worcester and its cathedral. In the evening was a most noteworthy garden fête in the Botanical Gardens at Edgbastin. Wednesday was again devoted to papers of the professional type in the morning, and to a visit to the engineering school of Birmingham University. In the evening was a most distinguished reception by the Lord Mayor and Lady Mayoress, with music of a high order.

On Thursday the party started by motor busses for Stratford by way of Kenilworth and Warwick and thence by train to London. Others had other alternatives to Litchfield, to Coventry and Rugby.

On Friday was the concluding session in London, with its extended votes of thanks to all who had been so courteous both in Birmingham and London and elsewhere. In the afternoon courtesies by invitation were a feature, and in the evening the great banquet was held in the Connaught Rooms. President Aspinall had the chair

of honor, and Ambassador Whitelaw Reid responded for the United States and Prof. F. R. Hutton for The American Society of Mechanical Engineers. Sir William H. White, Past-President of the Institution and Honorary Member of the Society offered the latter toast. Professor Hutton's response covered the unity and differences in professional atmosphere on the two sides of the ocean; and the significance to the world and its progress that both branches of the Anglo-Saxon family had so much of their ideals in common.

On Saturday were excursions to Windsor and Marlow, part by rail and part by steam launches on the River Thames. On Sunday, a special service in Westminster Abbey under the light from the memorial window to Sir Benjamin Baker, Honorary Member of the Society, brought the visit to a close in fitting form.

No mention has been made in detail of many professional courtesies involved in the long list of alternative excursions arranged by the hosts of the party both in Birmingham and London and elsewhere. Sir William White entertained the officers of the Society at a handsome private dinner; tea was served in the Zoological Gardens in one of the pavilions; Mr. Swasey also gave a private dinner to members of the Council and executive committee; Messrs. Maw and Thornycroft gave garden parties.

Here again also as in 1889 and 1900 addresses and resolutions of distinguished character were prepared by committee and sent to the hosts.

The international reunion which closes the period of 33 years of the Society history is the German trip of the Summer of 1913. This was arranged for by the Verein deutscher Ingenieure through personal visits of their representatives, Dr. von Miller and Dr. Conrad Matschoss, and by extended correspondence with the Secretary of the Society, Past-President E. D. Meier, and others on an executive committee. The booking of passage on the steamer Victoria Luise of the Hamburg-American Line began very early in the winter and the

sailing of upward of 300 members and guests took place on June 10. The same problems were met this year as before on similar occasions, in adjusting a limited accommodation both on the steamer and on the tendered excursions on shore to the requests of members to bring with them guests of their families or acquaintance. To what proper extent may such outsiders, booking accommodations early, be allowed to occupy places of members who are debarred from early decision, and who may rightly feel aggrieved that places primarily intended for them by virtue of their membership should be filled by non-members?

The steamer trip of the 1913 party was made a special feature of the pleasure of those who went with it as in 1910. A committee was organized of which Prof. A. M. Greene, Jr., was the leading spirit and provided entertainment for nearly every day. A reception on the second evening out brought the entire ship's company into acquaintance both with the officers of the ship and of the party and made all participants in what was to follow. These features were lectures by competent members on some assigned topic, and included one by Mr. Henry Hess, tracing the history of the German Empire, the steps leading to the unification of the States and the present industrial activity; one on German art by Prof. Henry E. Clifford; one by Mr. Worcester R. Warner on German cities; and one by Prof. C. R. Richards, on the German Educational System.

The ship being a German vessel, and the party bound for Germany, the occasion was taken to celebrate the twenty-fifth anniversary of the accession of the present Kaiser, falling on June 16. Prof. Wm. H. Carpenter, provost of Columbia University and an expert in Germanics, responded to the Captain's toast at the Silver Jubilee dinner. Besides these formal features of the ship life, informal and frolicsome occurrences were not lacking. Mr. Frank B. Gilbreth was sworn in with pomp and formality as special police officer, and later brought to mock trial for misdemeanors such as exceeding the speed

limit on deck. There was a prize baby show, deck sports, games and contests. A game of wireless telegraphy was organized in which a message of twenty words was to be written in rhyme. Two dances were given, one a cotillion.

Representatives of the Verein deutscher Ingenieure came aboard at Plymouth, England, to greet the party and sail with its members to the port of entry into Germany. The party landed on Thursday, June 20, at Cuxhaven, and were taken by train to Hamburg.

On Friday forenoon the company assembled at the Landing Stage Restaurant of the river steamers where after breakfasting they listened to a lecture about the Harbor of Hamburg and the tunnel under the Elbe by Geheimrath Bubendey who is responsible for much of the recent work, and then took an excursion about the harbor in steamers.

In the evening a reception was tendered to the visitors by the Senate of Hamburg, which is one of the free cities, a miniature republic with a government of its own. The address of welcome was made by the Lord Mayor, and an opportunity was offered to inspect the magnificent Rathhaus, the seat of the local government. A banquet tendered by the Hamburg Section of the Verein deutscher Ingenieure in the Rathskeller beneath the same building completed the evening's entertainment.

On Saturday the tunnel under the Elbe, a municipally owned project with two driveways and two sidewalks, and with elevators at either end for teams and passengers was inspected. It was a pleasure to notice that the elevators were American, made by Otis. The party was then taken to the shipbuilding yards of Blohm and Voss where among other interesting things the Vaterland (55,000 tons, five tons larger than the Imperator) was on view. After lunching at the yards the party was taken to the power station of the elevated railroad at Barmbeck whence after being further refreshed they proceeded to the Hagenbeck Zoological Gardens, the attractions of which were explained by the younger Mr. Hagenbeck

Photo by E Goldensky Philadelphia

Fred. W. Taylor

lf. The evening was thoughtfully left free and ably employed in viewing the interesting points of ty itself.

AT LEIPZIG

nday, the 22d, was spent in going from Hamburg to ig where the party arrived late in the afternoon, in o witness the flight of several Zeppelins. Here the lants at the Leipzig meeting were already as- ed and the first union of the guests with the greater of their hosts took place at a tremendous reception Crystal Palace. The word "tremendous" is used edly for everything, company, place and entertain- was upon a large and generous scale, and of an nal character which afforded an excellent oppor- for the initial amalgamation.

Monday morning the opening session of the gen- neeting of the Verein deutscher Ingenieure was held Central Theater and it is an index of the esteem ich the engineer and this, his professional organiza- are held in Germany that His Majesty the King, rich August of Saxony, was pleased to be present be "promoted" to Doctor of Engineering. Count elin was also there and spoke briefly and the Grashof l was awarded to Mr. George H. Westinghouse.

t the conclusion of the award of honors, Dr. Lam- t presented a paper upon the Technical Science and re of the Present, and Dr. W. F. M. Goss's paper Influences Affecting American Engineering Prac- vas presented in Dr. Goss's absence by Past-Presi- Jesse M. Smith. One of the most enjoyable features e whole trip was a concert at the Gewandhaus red by the Senate of the City of Leipzig with an stra of nearly 100 pieces. This was followed by a ret in the large festival hall of the Central Theater, course of which several numbers were rendered by homaner-Boy Choir founded by J. Sebastian Bach. uesday's session of the Verein was held in the

lecture room of the Architectural Exhibition, then in progress. Opportunity was afforded to view the exposition, to visit several local industries and to take part in the dedication of the monument to the Battle of the Nations. The evening party at the Palm Garden was somewhat disorganized by a violent thunder storm, especially the intended celebration of the solstice on the lawn and the illuminations and fireworks.

AT DRESDEN

Leaving Leipzig the party arrived at Dresden before noon, and at two o'clock was taken to the Bastei (the Switzerland of Saxony) returning as far as Pirna by steamer on the Elbe and thence to Dresden by special train. In the evening a reception and banquet were given the visitors in the Town Hall by the City of Dresden.

The following forenoon was devoted to sightseeing. At the Mechanical Engineering Laboratory of the Technical High School, Professor Mollier, author of the steam tables and the Total Heat-Entropy diagram which bear his name, escorted the visitors through his department. Interesting work upon heat interchange between an exploded charge of gas and the metal of the containing vessel involving the determination of the specific heat at constant volume were in progress. Another interesting feature was an engine provided with a delicate apparatus at every working bearing to indicate and analyze knocks. Other points of attraction were the local industries, the picture gallery and the Green Vault where the crown jewels are displayed. The visit to Dresden ended all too quickly with a luncheon tendered by the local division of the Verein and at 2:30 the party took its special train for Berlin.

AT BERLIN

To do Berlin in two days was beyond the power even of this now experienced group, but a frantic effort was made at it. In a little over two hours after the train reached the city the visitors were at a reception in the Palace of

the Imperial Diet. Friday and Saturday they visited many of the local industries and the Royal Technical High School at Charlottenberg. Saturday afternoon they were taken in automobiles for a drive over the famous Heerstrasse to Wannsee, given a steamer trip on the Havel, and a farewell supper in the Swedish Pavillion at Wannsee.

AT DÜSSELDORF

It is an all-day ride from Berlin to Düsseldorf, the next stopping place. The party arrived there late on Sunday afternoon and was given a reception in the Tonhalle by the City of Düsseldorf at which Dr. Frohlich, secretary of the Verein deutscher Maschinenbau-Anstalten, read a paper upon the Rhenish-Westphalian Industries, illustrated by lantern slides. This was followed by an opportunity for social intercourse with the refreshments without which no occasion there is complete.

Monday was devoted to visiting various industries and an inspection of the harbor, with a banquet in the evening given by the Rhenish-Westphalian Committee of the Verein. The feature of the evening was an allegorical play in which a huge billet of red-hot steel was flattened out under the forge press and when turned up revealed the emblems of the Verein deutscher Ingenieure and The American Society of Mechanical Engineers emblazoned on the apparently glowing metal.

Tuesday was again devoted to visiting industrial establishments by the men and to auto rides and visits to the art galleries by the ladies. A dainty lunch was served at the Mahlkasten, an artists' club, and the party moved over to Cologne, only an hour away, in time to see something of the city and dress for the evening on the Rhine. The program announced that supper and fun had been prepared by the Rhenish-Westphalian Committee and there was no lack of either, nothwithstanding that cold and damp weather prevented them from being served upon the lawn as this feature of a regular Abend-am-Rhein should properly be. Particularly enjoyable was

the singing by the Kölner Männer-Gesang-Verein, a male chorus of over a hundred voices, which has held the emperor's prize for a number of years.

AT COLOGNE

On Wednesday an opportunity was afforded to visit the industries of Cologne and the vicinity, the museums, etc., and the cathedral, the ladies and gentlemen of the local committee acting personally as guides and interpreters. In the evening a reception and banquet was given by the City of Cologne in the historic old Gürzenich built by the city in 1441-1447 for festival and similar purposes, serving for the ceremonial receptions of the emperors Frederic III and Maximilian I in the 15th century, of Charles V in the 16th century, an imperial diet of Maximilian in 1505 and the meeting of the Electors to choose King Ferdinand I in 1531.

AT FRANKFORT-ON-THE-MAIN

On Thursday the visitors started on their journey up the Rhine, going by train to Coblenz, then by boat to Rüdesheim and thence by rail to Frankfort-on-the-Main, where they were received by the Frankfurter Bezirks-Verein deutscher Ingenieure. The evening was spent in the Palm Garden, with feasting, music and special illumination.

At noon of Friday, the Fourth of July, luncheon was given in the Römer by the City of Frankfort and an opportunity afforded to inspect this and the neighboring old Guild houses. In the afternoon the party divided into groups for the inspection of various shops and factories. In the evening the Americans became the hosts, inviting the officers of the city and the Verein and the committee to help them celebrate the national holiday with a banquet in the Kurhaus Homburg.

AT MANNHEIM

On Saturday forenoon the party proceeded to Mannheim where it arrived in time for luncheon. After an

afternoon of sightseeing among the works for the men and of receptions at the homes of the directors for the ladies, a banquet was given by the city of Mannheim in the Nibelungensaal of the Rosengarten in the evening, at which a picked chorus of 24 male voices was a specially enjoyable feature.

AT HEIDELBERG

Sunday was devoted to a visit to Heidelberg. The inspection of the castle was somewhat interfered with by the rain, which abated, however, in time to allow the party to go in open boats upon the Neckar and see the castle illuminated and an elaborate display of fireworks upon the bridge and river bank. Heidelberg had been a bright spot in a glittering program, and notwithstanding the unpropitious weather the expectations even of the most sanguine were fully satisfied.

AT MUNICH

Monday, the 7th, was spent in getting to Munich, where the trip ended. It would seem as though there was nothing left that man could do to sustain the interest of this much entertained crowd and provide new sensations of pleasure and enjoyment, but the Bavarians were equal to it, and their welcoming evening in the world-renowned Hofbräuhaus was so in keeping with the reputation of the place for good fellowship and camaraderie, and different enough from all that had gone before that the enthusiasm of the guests was aroused to a higher pitch than ever.

On Wednesday, July 9, a visit was paid to the German Industrial Museum. The president of this, Dr. Oskar von Miller, is also an Honorary Member of our Society and was to be president in a later year of the Verein deutscher Ingenieure. Luncheon was served in the still uncompleted building, and this was made the occasion of presenting to the Museum a model of the Panama Canal, which the Society had brought over. Past-President E. D. Meier made the presentation, and in his response Dr.

von Miller presented to the Society an original Fraunhofer spectroscope. In the afternoon an excursion was made to the Lake of Starnberg; and the closing ceremonies took place at a banquet given by the City of Munich in the old Town Hall.

A final assembly of the party was held in the Regina Palast on Thursday morning, July 10, where resolutions were passed to all who had been concerned in its entertainment. Dr. Conrad Matschoss, who had been of those who boarded the steamer at Plymouth, received a special demonstration. In his response he expressed the hope that one of the results of the visit might be the establishment of permanent and pleasant relations between the engineers of the two countries, and urged upon the Americans the preservation of monuments and the record of their history of industry and engineering. World history as now written is full of deeds of kings and glorifies warriors, but is silent on the work of great inventors and industrial captains, whose work has done more to develop the race and its civilization than those whose portraits fill the galleries and whose deeds have moved the historians, painters and poets. He urged a concerted movement to preserve the records of the work done by such American engineers as Charles T. Porter and John Fritz, so that its meaning and importance might be emphasized. The models and apparatus used in classic and historical experiments should be preserved and the data of the beginnings of all industries. This was the work in which he had been engaged and he pleaded for trans-Atlantic coöperation.

In the afternoon the Technical High School was visited, where Dr. Knobloch personally exhibited his laboratories and where his work with Jakob is the present basis of knowledge upon superheated steam. Dr. Diesel, Honorary Member of the Society, received a number of the visitors in his home.

After this the party broke up, going its way in differing directions, some to travel further in Germany, others to sail directly for home from various ports. The So-

ciety has on its files and among its records the originals of invitations and programs of the entertainment in various cities, and noteworthy and valuable souvenirs were brought back by the party and particularly by its ladies. The albums of photographs taken by the party will keep fresh a gallery of delightful memories. The history of the next international interchanges will belong to a later period in the history of the Society.

ENGINEERING CONGRESSES

A congress of engineering is a gathering of engineers in the various specializations of their profession, for the reading and discussion of papers. An international congress is such a gathering which shall embrace practitioners from different countries and usually, therefore, speaking several different languages.

A convention attended by representatives of two nations has been called a joint meeting. Such were the meetings in London in 1889 and 1900, in Chicago in 1904, in Birmingham in 1910 and in Germany in 1913. The only true congress was that of Chicago in 1893, when the four societies of American Engineers appointed a joint committee to issue such invitations as were required in connection with the authorities of the Columbian Exposition to the societies in Europe to send papers and delegates. The congress was divided into sections or groups: (*a*) civil engineering, (*b*) mechanical engineering, (*c*) mining engineering. (*d*) metallurgical engineering, (*e*) engineering education, (*f*) marine and naval engineering, and (*g*) military engineering.

A group covering electrical engineering was omitted because the society specializing in this direction had made arrangements for a special joint meeting with the British Society at another date, and could neither change the date nor hold its reunions twice. Each of the other engineering societies made itself responsible for the meeting of its group, the departments of the United States Government undertaking the last two, and specialists from the other bodies undertaking (*e*). This congress resulted

in the formation of a new society, to concern itself with engineering education, under the title of the Society for the Promotion of Engineering Education.

The American Society of Mechanical Engineers made the sessions of (*b*) take the place of its Spring Meeting, secured papers for presentation and undertook the publication of papers on mechanical subjects by other participants, non-members of the Society, in its Society volume for that year. Its excursions for its own members were also made features of the entertainment of the foreign delegates and the members of American societies operating the other divisions. The sessions were held in the Memorial Art Palace on the Lake Front of Chicago. President T. C. Bonney of the Congress Auxiliary Committee of the Columbian Exposition opened the congress on the morning of July 31, 1893, and responses were made. The congress then separated to various rooms. The Mechanical Engineers, following their usual custom, established headquarters for registration in the Art Palace and gave pamphlet copies of their papers freely to all who requested them.

On Saturday, August 5, the Congress met in joint session for final session. Mr. Octave Chanute, chairman general then announced the Congress adjourned.

The Society found some difficulty in getting the authorities of the exposition to take what appeared to be their share of the general expenses of the Congress; there were incidental increases in the cost of everything connected with its own meeting due to its size. There was a fee for every participant in the Congress to cover the cost of publishing the volume of the proceedings of the Congress. All these made a heavy draft on the budget of that year; and made the authorities of the Society wonder whether the value of the professional results of the congress was worth either the labor or the direct outlay in funds. The profession received some advertising, however, which it might not otherwise have had.

Hence, when in 1904 the authorities of the St. Louis Louisiana Purchase Exposition of that year asked the

F. R. Hutton

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four national engineering societies to assume a share of the responsibility for a repetition of the Congress of 1893, the chairman of such a committee of conference as was appointed under this request, reported that the Institute of Electrical Engineers had completed arrangements for an assembly international in character, and that both the Mining and Mechanical Engineers were planning joint meetings with English or continental bodies. There appeared no expressions from the profession at large calling for such a congress, nor urging an interest therein; nor had the exposition authorities committed themselves to the meeting of the expenses entailed in the summoning of such a congress for postage, printing, publication or the compensation of clerical and other personnel. Hence it was the recommendation of Col. H. S. Haines who had represented the Mechanical Engineers in the conferences that the effort of the Society should be directed to giving the Chicago joint meeting an international character. In this advice the Council and Society concurred.

In spite, however, of this experience, the Society has felt constrained by a species of *noblesse oblige* to become a guarantor of an Engineering Congress, desired in 1915 in California and as a feature of the Exposition which signalizes the opening of the Panama Canal. The future only can show whether the experience of previous years will be repeated, or whether changed conditions will make the projected gathering the success desired by its promotors.

Enough has been said in the early part of this chapter to make it clear that joint meetings at proper intervals are of splendid value, and are a stimulus to friendly relations between engineers of the two nations concerned. But the introduction of a third nation or of more than three frustrates this wise purpose, by virtue of what appears to be a psychological law, whose popular recognition is expressed in the adage, "Two is good company; three is a crowd." No friendships are formed

in a crowd, unless two join together and against the crowd, and that is just what is not desired.

The surroundings of a crowded exposition in any city, which are the dream and ambition of the hotels and railways and commercial interests in general behind such an exposition, are the very ones to deter engineers from coming together to expose themselves to these discomforts. The broad philosophy of modern meetings of an engineering society in its flood tide of activity, where many topics are considered in synchronous meetings of sections or groups, gives to these stated meetings the significances which attach to sessions of a Congress, and without the display features which add no strength but consume time and energy and money. The policy of holding meetings at places some distance from the main body of the membership within the country, or of holding meetings outside of it, should not be followed to the degree that members should have any ground to complain that only a wealthy and leisured class of the members can get to such meetings. The meeting of the Society is the right of all; and it does more good to the younger man on a small salary than to the veteran in the profession compensated handsomely for the value of his experience and service. Within these limitations, the joint meeting is better than the more flamboyant congress.

CHAPTER XV

The Library of the Society

The nucleus or starting point of the library of an engineering society is the first issue of its professional papers in book or pamphlet form. This is a legal tender or currency of acceptance with other societies of kindred aim, also publishing papers and desiring an exchange of commodities, and technical journals published in all parts of the world are glad to consider the courtesy of transmittal of the society papers to be an offset or equivalent for the regular issues of their publications.

The transactions of societies are among the most valuable treasures of a library, for these are up to date, while the textbooks are as a rule on their way to obsolescence before they are completed by their authors. Transactions are also historically and professionally valuable, because they give with fulness of detail what the later condensations in general books will summarize and omit.

While the Society had no office but that of its Secretary from 1880 to 1883, there was no Library, because such exchanges as were arranged for could not be sent forth in shape to be consulted, and there were no funds available to bind the loose units into volumes and sets.

At a meeting of the Council on February 15, 1883 (the same meeting which elected F. R. Hutton as Secretary of the Society), Mr. C. J. H. Woodbury moved that the new Secretary be instructed to insert in the next communication to the members and to the technical press, a request for circulars and price lists of manufacturing establishments and reports of engineering operations, with a view to making a catalogue of contemporaneous engineering work, to be filed properly and placed at the

service of members. It was requested that in the price lists the ruling prices and discounts in January 1883 be affixed and that such catalogues of machinery be contributed as would show the growth and development of the industry to which they belonged. This motion, which was carried and put into effect, was the foundation of the present valuable library of The American Society of Mechanical Engineers, which is now housed with the collections of the other founder societies, the American Institute of Mining Engineers and the American Institute of Electrical Engineers, on the upper floors of the United Engineering Building, thus forming an integral portion of what is doubtless destined to become one of the great professional libraries of the world.

The response to the request contained in Mr. Woodbury's motion was prompt and liberal, many of the technical periodicals contributing complimentary copies of their publications, and some of them sending complete bound files of their back numbers. Manufacturers sent not only their trade catalogues but books, to aid in founding the library. A standing committee on the library was appointed, and in the first announcement sent out by Secretary Hutton, dated March 1, 1883, the statement was made that the Secretary's office contained a growing collection of periodicals, transactions, and books accessible to members, and the hope expressed that in the near future the collection would receive such additions as would render it both interesting and valuable for reference.

At the Annual Meeting in New York in November 1884, the committee appointed to take steps for the definite organization of the library made an extended report, which will be found in the full Transactions for that year. This report recommended the establishment of a permanent fund for library purposes and for the provision of its current expenses, that no demand upon the current funds of the Society need be made. Subscriptions for a permanent fund were solicited, and also contributions in the form of annual subscriptions of $2 or

more, and an appeal was also made for contributions of books and papers relating to mechanical engineering. It is especially interesting to note the realization even at that early date that the library might become the incentive which should lead to the acquisition of a permanent home of the Society, and the following quotation is given, as showing the beginning of an effort afterwards so abundantly realized (See Chapter XI):

Accommodation for the Library to be provided in whatever rooms the Society may occupy. In this connection, however, your committee begs respectfully to call attention to the great desirability for the advancement of the general interests of the Society, and especially for the adequate accommodation of the Library which it is hoped to create, of inaugurating early measures for the creation of a fund to provide a permanent building for the general uses of the Society.

Following this report of the Library Committee, the Secretary issued a circular to the membership calling for subscriptions to the fund and to the annual contributing list. The result was that more than 100 members responded, and the organization of the library was thus effected. It continued, with modifications, until it was finally merged into that of the Society, as will be told hereafter. Reporting upon these facts at the Atlantic City Meeting, in May 1885, Mr. Henry R. Towne, chairman of the Library Committee, called attention to the desirability of providing accommodations for the Library, and mentioned the discussion of the construction of a union building for the several national engineering societies, showing the extent to which the idea had already taken root.

In the report of the Library Committee for 1885 was given for the first time a list of accessions to the library, and it is interesting to note that valuable books were contributed by members, while the exchange list included the principal technical papers then published in the United States and Great Britain, with some Continental accessions. These lists continued to be published in successive volumes of the Transactions, and showed a continual growth of interest in the development of the library, although the books were housed as yet in the

limited quarters available in the Secretary's office, where they were by no means convenient for general use.

Interest among the membership in the Library also began to show itself in the form of bequests and large contributions. Thus, in the report of the Library Committee for 1888, appears the bequest of the private library of Mr. Alfred B. Couch of Philadelphia, including a number of important and valuable books. In like manner, there was announced at the Annual Meeting in November 1889, an important gift of books from the library of the late Charles W. Copeland, formerly Treasurer of the Society, the gift including many valuable books relating to the history and development of mechanical engineering. Important progress was also made in the completion of the files of the leading engineering journals, and the library began to assume real value as a reference collection, apart from the important part which it was soon to play as a financial asset in the development of the Society.

The move of the Society's office from the straitened areas of 15 Cortlandt Street to the Stewart Building at 280 Broadway was backed by the ambition to make the library more available for consultation and to put the files of Society Transactions and Proceedings within the reach of the members. Bookshelves were added to the earlier office furniture when this step was taken.

But an office building with no adequate elevator service after business hours and with no adequate reading lights and without the library reading-room atmosphere, was still felt to offer no satisfactory solution of the library problem. These conditions brought about the decision to move to the first floor of the Mott Memorial Library Building at 64 Madison Avenue, then available, and the experiment of opening the library in the evenings. Great improvements in the gas lighting were made, and the members began to drop in. But the library was in the charge of a stenographer of the office, albeit a man of studious tastes, and there was no catalogue.

Then came in May 1890 the great change significant in so many ways, but in none more than as respects the library of the Society. It moved from Madison Avenue, from a floor area shared with the insistent uses of the executive offices of the Society, to a building specifically fitted up for library purposes as respects its second floor and the gallery extension on the same level. The electric light was also introduced to eliminate the injury to paper and binding from the heat and products of combustion from gas burners. The change came through the purchase from the New York Academy of Medicine of their former home at 12 West 31st Street, and the consequent development of a project that had been impossible or seriously handicapped before. The space devotable to the library was filled from floor to ceiling with convenient permanent shelving, and the quiet appropriate to a reading room could be secured by reason of the fact that the offices and their typewriters were in other parts of the building.

The Society at once set out to realize its dream of a free public reference library of engineering; and to this end, as well as to attain some other desirable possibilities concerning which the Society charter had not been clearly worded, the Past-Presidents of the Society formed themselves into a Library Corporation and procured a charter from the State of New York under favorable general acts relating to the conduct of free public libraries. This body was called, The Mechanical Engineers Library Association. It held the title to the real estate for the benefit of The American Society of Mechanical Engineers and for the American Institute of Electrical Engineers for some years, and the by-laws provided for the support of the association, not only from the leases to the foregoing bodies but from two classes of sustaining members. One class was known as Fellows of the Library, contributing regularly to the library fund, the others were the Members, embracing all elected members of The American Society of Mechanical Engineers. The affairs of the Association were placed

in the hands of a Board of nine trustees, elected by the Fellows of the Association, these trustees having the management and control of the affairs, property, and funds of the Association, with full power to mortgage its real estate, and to issue bonds secured by mortgage thereon, and also to conduct the library.

A charter was obtained for this Association on March 4, 1890, for the conduct of a free public library containing a collection of books, charts, models, apparatus, and other literary and scientific works relating to the subject of mechanical engineering, so that the scope of the library was extended to include many things of historical value in addition to books, an extension which has led to the acquirement of numerous valuable relics which might have been dispersed, and possibly not preserved at all. The fundamental object of the Library Association, however, was to act as a holding corporation for the real estate which it was proposed to purchase for use as a home, both for the library and for the Society. The Trustees, as originally selected, consisted of the Past-Presidents of the Society, together with the Secretary, the original board including Messrs. Thurston, Leavitt, Sweet, Holloway, Sellers, Babcock, See, Hutton and Towne. Mr. Henry R. Towne was chosen Chairman of the Board, a position which he held until the consolidation of the Association with The American Society of Mechanical Engineers in 1907.

The Library Association having thus been incorporated, the purchase of the house in 31st Street was concluded, the price being $60,000, of which $33,000 was left on first mortgage by the former owners, while the balance of $27,000 was paid in cash. This amount, together with the additional funds required for the repair and decoration of the building, was raised by the issuance and sale of bonds to the value of $31,800. The bonds were promptly taken by members of The American Society of Mechanical Engineers who were especially interested in the movement, and the matter was thus most success-

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fully financed, a success largely due to the existence of the library and the association incorporated in its name.

A portion of the building was let to the newly organized American Institute of Electrical Engineers, but the greater portion was occupied by The American Society of Mechanical Engineers, both societies being tenants of the holding corporation, The Mechanical Engineers' Library Association. Thus the library, from its modest beginning as a collection of trade catalogues and technical periodicals, became the means by which the Society was enabled to occupy a most desirable building in one of the best locations in the City of New York, under conditions which at that time might not otherwise have been practicable.

The house, which had formerly been one of the fine old-fashioned brown-stone residences, typical of New York home life, had been converted by the previous owners, the New York Academy of Medicine, into a building admirably suited to the needs of a professional organization. The front parlor had been left practically unchanged, but upon the garden plot in the rear there had been built a convenient meeting hall, this being two clear stories in height, with good basement room beneath. The assembly hall communicated both with the back parlor and the main entrance hall. The second floor rooms were fitted for the use of the library, while a balcony running entirely around the upper portion of the meeting hall added a corresponding amount of wall space to the shelf capacity. On the upper floors were convenient sleeping rooms for the use of members, in addition to the space originally let to the American Institute of Electrical Engineers, and subsequently added to the space available for the purposes of the Society.

Although the real estate was thus held in the name of The Mechanical Engineers' Library Association, the books, etc., continued to be the property of The American Society of Mechanical Engineers, being loaned to the latter organization by the former as a part of the consideration passing between the two bodies in connection

with the conduct of the building. The report of the Library Committee for 1890 showed a continual improvement both in the funds and in the collections, and it was evident that the library had become a most powerful auxiliary in the development of the Society.

When the house at 12 West 31st Street had been used by the New York Academy of Medicine, the walls of the meeting hall, as well as the other rooms had been covered with portraits of eminent members of the profession. Those members of The American Society of Mechanical Engineers who had been in the party which visited Europe in 1889, had also seen and appreciated the manner in which the homes of the great societies there were adorned with similar works of art. When the house in 31st Street was first occupied by the Society, the barrenness of the walls contrasted painfully with the condition in which they had been seen at the previous meetings held in the same room, before the pictures belonging to the Academy of Medicine had been removed. There thus appeared a stimulus to the members to begin a similar collection of portraits and works of art and to restore in some degree the effect which had formerly existed. Thus began the collection of paintings, photographs, etc., which now forms so interesting a portion of the Society's property.

One of the earliest pictures thus acquired by the Society was an oil portrait of Alexander L. Holley, presented by Mrs. Bunker, formerly Mrs. Holley, a gift which was formally unveiled and accepted in an address by Mr. James C. Bayles. Other early acquisitions of this sort include a marble bust of Mr. Joseph Nason, presented by Mr. Carleton W. Nason; a portrait of Joseph Harrison, Jr., presented by Mrs. Harrison; a portrait of Prof. Franz Reuleaux, presented by Mr. H. H. Suplee; a pastel of Prof. W. J. M. Rankine, given by Prof. F. R. Hutton, together with numerous photographs of interest. A notable gift of much historical value was the original autograph drawing, by Robert Fulton, of the Fulton, the first steamer to ply on Long Island Sound,

bearing the date of 1813, while various old drawings and correspondence relating to the work of Fulton afterwards came into possession of the Library. The portrait of Ericsson, by Ballin, was the one formerly owned by the designer of the Monitor, and was rescued by Professor Hutton from a curiosity shop where its value was hardly understood. Thus the interest of members grew continually in the development of this portion of the work of the Library, and further acquisitions of this sort form an important portion of the records of the growth of the Society. They will be described at length hereafter in this history.

Now followed an era of a gradual and healthy growth of the library. Unbound series were brought together and strongly bound. Gaps in series were filled to make complete sets. New exchanges were secured to broaden the scope of the topics covered. A card catalogue of authors, subjects and titles was begun and developed, first under Mrs. Emma C. Griffin, and later under the trained hand of Miss Isabelle M. Thornton.

The library of the Society was unique in several directions at this time. First, the catalogue was not by book titles but was an index of subjects. Under each subject were the book titles covering treatment of that item. Men in search of information usually know the subject they want to study, but do not know who has written upon it nor under which book title to look. A title beginning with the word treatise, for example, is a very blind indication as to the book wanted. Furthermore, the shelves were classified vertically in sets, with a title over the highest, giving the subjects grouped under that sign. Strangers could therefore browse among the shelves under the general heading or general class of the subject they were searching for. Some readers are annoyed at the necessity for going always to an attendant for each move in their game. Certain shelves were assigned to current periodicals and the gallery had the sets of Society Transactions with the current issues in a steel filing case until a volume was completed and ready to

bind. Members calling for books not on hand were asked to supply the librarian with the title of the lacking book, and as fast as funds were available these gaps were supplied. But the increasing bulk of the binding required year by year kept the library always a little in arrears of the demand, and with a waiting list of books. Its transactions of societies and technical journal lists have always been full and complete, for its own publications could be used as exchange for a desired periodical, but booksellers would use these only to a limited degree as a medium of exchange for books.

The significance of Mr. Andrew Carnegie's gift to engineering in the form of a United Engineering Societies Building in 1903-1904, was at once realized in its relation to a library development for the societies. The Institute of Electrical Engineers had received from Dr. Schuyler Skaats Wheeler its splendid gift of the Latimer Clark Library, on the express condition that it be housed in a fireproof building and made available for general use. So the function of a Library was incorporated into the By-Laws of the United Engineering Society and thus into its charter, and the building committee planned the thirteenth or top floor of the building as a reading-room and the twelfth floor for book stacks with incombustible shelves. The top floor gives light, air, freedom from dust and reduces noise to its lowest terms. The three founder societies named in the deed of gift were at once asked to appoint three representatives on a joint Library Board and their recommendations were most carefully considered in the plans.

After the societies entered the building in 1907, the Library Association of the Mechanical Engineers was legally wound up by action of the Supreme Court on plea and brief, and consolidated with The American Society of Mechanical Engineers, who already owned the equity in the real estate and received all other property by legal procedure on October 17, 1907. The books of the library had also always been the property of the Society and were only loaned to the Library Association to carry on

its work. The increment in value of the real estate of the Library Association was used in part, to pay for the land on which the Society building stands. The house in 31st Street was bought in 1890 for $60,000, and was sold in 1907 for $120,000.

The library of the Society is now one of the constituent elements of the great library in the Engineering Societies Building. It is operated under a Library Board appointed by each of the governing bodies of the three founder societies, and approved by the representative Board of Trustees. This Library Board is in charge of all detail, and meets every month for its important duties. It prevents duplication of effort and of purchase, and seeks to coördinate the development along all lines of growth. Recent improvements in lighting and increase in the shelf areas on the main library floor, have been the most noticeable physical changes of recent years. Mr. W. P. Cutter, the general Librarian under the present conditions, was appointed in February 1909. The library, at the end of the first third of a century of the Society life, contains about 50,000 volumes and pamphlets and monographs.

CHAPTER XVI

Some Professional Standards Recommended by Committees of the Society

It has been said earlier that one of the great opportunities which its founders foresaw for their new organization was that of speech and action for the profession as a unit, and as representing the weight of opinion of a large number when such action took concrete form. No individual can have the same weight as that of an aggregate of many such persons.

It is true of applied science in engineering and of art in architecture to a degree not by any means the case in other lines, that there may be many correct solutions of a problem, but all different from each other by reason of the personality entering into each solution. But as a practical and commercial proposition, there are very great advantages attaching to a standard set of proportions which shall be used by all to whom the problems are submitted. Standards in the numbers of threads to the inch on all bolts of a given diameter were sought in one of the earliest attempts to bring order out of preexisting chaos, and this was attained outside of the Society and before it existed. But the advantage to the Society of creating an agreement on many other such matters was early brought to its attention.

The Society also very early saw the wise distinction to be made between the action of the Society which accepted a proposed standard reported by a committee and recommended its use, and the other plan of adopting such a standard as an official act. The recommendation made the use of such a standard a voluntary but exceedingly wise step. The adoption would have entailed a sort of obligatory aspect on loyal members, and there are

those who are more easily led than driven. If some pecuniary loss was entailed by the use of an adopted and therefore a compulsory standard, a civil suit might lie for the damages so claimed, and it would be against the Society as a corporate body. A recommended standard has the force of the ability of those who created it, and no one can find any legal ground on which to attack it or attempt to enjoin against its use to his alleged detriment.

The usual practice to secure the creation and subsequent recommendation of a standard has had the following steps (see also Chapter IV).

(*a*) A paper by some person competent to speak, in which the need of such standard shall be made clear.

(*b*) A discussion in confirmation of the need from the experience of others than the author.

(*c*) A recommendation to the Council that it consider the advisability of appointing a committee, with power to appoint if it seems wise.

(*d*) If affirmative action is taken, the committee is appointed. The reader of the initiating paper is usually a member of such committee and perhaps its chairman.

(*e*) The consideration in committee; conferences with parties interested inside of the Society and without.

(*f*) A report presented for discussion at a Semi-Annual or Annual Meeting.

(*g*) The result of this discussion offers the alternatives:

(1) The normal one is for the report and its recommendations to be so conclusive and therefore so acceptable that the Society takes its standard action thereon, accepts the report, recommends the use of the standard therein presented and orders the report printed in Transactions.

(2) The report may be made as a report of progress to make public the mind of the committee, and to invite criticism and modifications. After this treatment it is referred back with the discussion, and the committee reports

again until the recommendations are ready for the action of (1) above. The discussion is printed in full, either bound up with the report, or as a separate pamphlet, or in both forms. It is supposed and assumed that the discussion includes all that can be said in opposition to the recommendations in the report, and is therefore a measure of the general unanimity with which the rest of the Society has received it. That is, the discussion presents all that anybody can urge in disfavor of the ideas of the committee, so that every one can judge of the force and validity of attacks upon its work. The committee as a rule accepts the points which are well taken and incorporates them as its own action.

This method of treatment is believed to be much more serviceable than letter ballots by the entire membership. Many would not vote, more would vote without expert knowledge or study of the problem presented, and on the basis of their trust in the ability and thoroughness of the committee's labor. The few remaining have either taken part in the debate, or are so few that their vote adds little to the force already belonging to the personalities on the committee.

These committees reporting on standards or other matters have been called Professional Committees, because the topic referred to them as a rule is a matter of professional significance and not one having a direct commercial or financial or administrative bearing.

The first of these Society standards is embodied in paper No. 168, of Volume 6, and presents a Code for the Conduct of Trials of Steam Boilers. It embodies both the Standard Form of Log for use in such tests, the considerations which led to the standard, some possible alternatives, and a comment on standard apparatus. The debate on the Society policy respecting such a report is printed separately as paper No. 185 of Volume 6. Prof. William Kent was chairman of this committee, and it

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ıulated and gave standing to the unit of boiler horse-
ər proposed by Mr. Chas. E. Emery in 1876, at the
of the great series of boiler tests at the Centennial
ibition at Philadelphia.

'he second committee to report was that on a Stand-
for the Diameter and Overall Dimensions of Pipe
its Threaded Ends, and the fittings which such
ıds were to fit. This report recommended and
ulated the Briggs standards, created and offered by
ate Robert Briggs of Philadelphia, a member of this
əty, and first published in 1882-1883 in the proceed-
of the Civil Engineers of Great Britain, under the
ing of American Practice in Warming Buildings by
m. The manufacturers of such material had con-
əd to agree to such standards and to the use of gages
hreads which embodied them, and thus put an end
e confusion and embarrassment which were at that
so annoyingly prevalent. The report and standards
in papers No. 226 and No. 241 of Volume 8. Mr.
lerick Grinnell was chairman of this committee, but
ecognized that the working factor of the result was
Geo. M. Bond, its efficient secretary.

'he next topic to be broached in this class was in-
uced in a paper by Mr. Percy A. Sanguinetti at
ıdelphia in 1887, on the Divergencies in Flange
ıeters, and particularly the divergencies in diameter
e bolt circles in such flanges as used in pipe work,
ngines, valves, pumps and fittings. The committee
reported progress in May 1890, but, by reason of
hs and other causes, was reconstituted to include
esentatives of the productive interests and reported
rst standards in paper No. 481 of Volume 13 in 1892;
again in papers No. 504 of Volume 14, 1892, and No.
of Volume 21, 1899. Mr. Carleton W. Nason was
man of the committee which presented the first
lard proportions, and Mr. Edward P. Bates pre-
əd the last diagrams and tables.

'he continually increased pressures to be resisted
the increasing diameters of pipe for large power

stations have called for extensions of the standards recommended in 1899.

A further standard, the Method of Conducting Duty Trials of Pumping Engines, was reported at the Cincinnati Meeting in 1890; was discussed and reported anew at the Richmond Meeting in that same year; and is published in its final form as paper No. 381 in Volume 12 and with its discussion as a separate paper as No. 437 of Volume 12.

At the Cincinnati Meeting in 1890, a committee on Standard Methods of Testing Locomotives was ordered, and reported at Chicago in 1893. The report is paper No. 552 in Volume 14. A committee which presented a large volume of professional material in the form of reports of progress leading up to a standard was that on Standard Tests and Methods of Testing Materials. Its first official paper is printed as an appendix to the papers of the New York meeting of 1889, No. 378 of Volume 11, which was supplemented at Cincinnati as paper No. 380. Further supplemental reports were again brought to the Society as Nos. 479 and 480 of Volume 13; as Nos. 550 and 551 of Volume 14, and Nos. 633 and 654 of Volume 16. Paper No. 698 of Volume 17 is a report on the action taken at Zurich conferences in 1895. The working member of this committee was again its secretary or reporter, Mr. Gus C. Henning, who not only labored indefatigably, but who attended European conferences and congresses, at his own sacrifice of time and incidentals, receiving only a minimum allowance for his traveling expenses from the Society. It was the purpose of the committee and its effort to bring about a standard form of test specimen for use in physical and mechanical tests; and further to standardize the methods of test, the time to be taken in the process of fracture and the recording autographically of the behavior of the test piece in the testing machine, that recorded tests by different observers might be mutually comparable. After Mr. W. J. Keep's Tests on Cast Iron and his observations on test pieces were on record, Mr. Henning included many

of Mr. Keep's series of tests in the work of his committee, running as papers Nos. 631, 655, 656, 695, 878, 1041, and included in Volumes 16 to 25.

As a result of the formation of the American Society for Testing Materials and its inevitable assumption of much of the work, Mr. Henning and his committee had planned to do, there was no final or conclusive summary or official report presented, but the Society approved each section and in 1900 discharged the committee. Mr. Henning's failure in health and his entry thereafter into other lines of business prevented his giving the matter the personal attention which it might otherwise have had, and he never received the meed of praise which his devotion to the matter would have justified. No committee reports of the period are more full and exhaustive than his. Messrs. Towne, Thurston, Egleston and Morgan were Mr. Henning's associates, and of these Mr. Towne is the only survivor.

In 1892 a committee reported Standards for Tests to be made of Engines and Machinery at the Columbian World's Fair of 1893 if such should be made, with a view to having these of real scientific and comparable value (No. 503, Vol. 14).

In 1895 Mr. F. W. Dean, in paper No. 650, criticized the Code of 1885-1886 for reporting boiler trials, and in 1898 Mr. Barrus, in paper No. 781, made a Plea for a Standard Method of Conducting Engine Tests. The result was a revision of the Standard Boiler Code, presented as papers Nos. 827 and 828 of Volume 21, and recommended to replace the previous standard code. The necessity for this action and the ease with which it was taken supplied another argument in favor of the Society policy opposed to the adoption of standards. Had the previous standard been adopted, it must have been reconsidered, the former action rescinded, and the new code acted on, in order to become a new standard. A further and more extensive revision of standards for testing power apparatus was reported by an enlarged committee in 1913 and which completed its work in 1915.

At the Washington Meeting of 1899 a paper by Mr. J. B. Stanwood, on the necessity for coöperation between the builders of the engines and those of the generator armatures in direct-connected sets of such power-transmitting apparatus, resulted in the appointment of a committee on Standards for Direct-Connected Generating Sets, of which Professor Stanwood was made chairman. It was to work in coöperation with a similar committee on the armature standards for the generator. It made a preliminary report for discussion at Milwaukee in 1901 and its final report in New York that same year as paper No. 916 of Volume 23. Mr. Barrus's paper, No. 781, had resulted in a Report on a Standard Method of Testing Steam Engines, published as Nos. 973 and 974 of Volume 24, and recommended in 1902. It had been suggested (1897) that the previous work on standardizing the threads and proportions of pipe and fittings had not covered the design of pipe unions, and the importance of this fitting in compressed air and other industries would justify a committee and its consideration and report. Such committee reported in 1901, and this is published as Nos. 917 and 948 of Volume 23.

At the Annual Meeting in December 1905 the Society received the report of its professional committee on a Proposed Standard for Machine Screws, both as to the threads and the proportions of the heads. The so-called Sellers or U. S. Standard of many years ago covered sizes of bolts and of cap screws from one-half inch diameter of stock and upward. The new electric and motor vehicle industries were calling for a similar standard for sizes smaller than one-half inch. This report is again a monument to Mr. Geo. M. Bond and is published as paper No. 1142 of Volume 29.

At the conclusion of the third of a century, a movement is nearly concluded to make the Briggs Pipe Thread Standard, now of America and Great Britain, the international standard of the world. If this is consummated it will put a fitting period to the splendid achievements of the Society in these fields through the wise and

energetic labor of the notable committees who have so unsparingly given their time and effort.

There are also other committees of the membership who have labored through the Society, but whose labors have not enriched the profession by a report creating a standard for professional use. Among such are the committee to secure a renewal of the United States Commission to test iron, steel and other metals. This commission had an existence and governmental support before the Society came into existence, but on the expiration of its period and the first appropriations Congress had not extended its period of service, and it had lapsed. It had created the great Emery Testing Machine now at Watertown, Mass., but no work on full-sized members had been possible. Prof. Thomas Egleston was the working energy, and he kept working at it, and reporting the lack of forward progress for many earlier years (1882-1886). There was coöperation in the American Society of Civil Engineers and through the Chief of Ordnance, United States Army, and the Society, in days of poverty, appropriated $200 for its committee's expenses.

Other committees were as follows: A committee to secure relief at the United States Patent Office in Washington from the conditions of congestion due to lack of room, and such changes as would result in expediting the procedure of issue of the patents after applications were sent in. The committee reported to the Society and the individual members were urged to use their influence directly with members of both houses (1884).

A committee to present a memorial to the houses of Congress urging on them the founding or a participation in the creating of a suitable memorial to Capt. John Ericsson for his achievements and to commemorate his services before and during the war of 1861-1865 (1889-1890).

A committee to memorialize the United States Congress for the creation of a commission to recommend standards and a bureau for their maintenance as re-

spects industrial products from various States where confusion now prevails (1889-1891).

A committee to provide joint headquarters in Chicago during the continuance of the World's Fair of 1893.

A committee to report a recommendation and proper action with respect to making general the use of a metal wire and sheet gage, the numbers of which shall be the thicknesses of the plate or wire expressed in thousandths of an inch. This committee reported the oval thickness gage, which was patented for safeguarding by one of the members of the committee and ownership assigned to the Society (1893-1894-1897).

A committee to conduct tests of fireproofing materials, tested the material used to cover the steel skeletons of tall buildings. The experiments were made at the plant of the Continental Iron Works at Greenpoint, and the material and steel were furnished by interested manufacturers. The report of these tests was published as No. 700 in Volume 18, but the tests could not be carried to completion by reason of the costs (1898). Later the best work in this field was done at Columbia University by Prof. Ira H. Woolson, member of the Society, and the apparatus and methods used were described in papers by him before the American Society for Testing Materials (1896).

A committee to sit upon a revision of the building laws of New York City (1896).

A committee to prepare and have in readiness the available material which may be used in opposition to a movement to make the use of the metric system and its units of length compulsory on the industry of the United States (1896-1902). The paper by Mr. F. A. Halsey, No. 971, Volume 24, and the report, No. 972, are the papers in the case, and the action of the Society is in paper No. 975 of the same volume.

A committee of conference on international standard electrical rules. Mr. C. J. H. Woodbury has represented the Society in these conferences and has reported on

their work and decisions (see Nos. 749 and 790, Volume 19).

A committee on standard specifications for steel in its various industrial forms, reported through Mr. W. R. Webster, as paper No. 945, Volume 23.

A committee advisory to the authorities of the Exposition in St. Louis in 1904, to act with a similar committee of the American Railway Master Mechanics Association in laying out tests for locomotives on the testing plant in the Transportation Building which the Pennsylvania Railway built and operated (1903).

A committee to consider and recommend a standard unit or units to be the basis of the thermal and dynamic performance in the processes of mechanical refrigeration. This committee is yet to make its final report.

A committee to further the movement for the conservation of natural resources, in water, fuel and forests, and to furnish the engineering knowledge and experience required in intelligent legislation to this end. This committee is still at work.

A committee to formulate standards for specifications and construction of boilers and other containing vessels in which high pressure is maintained. Work of monumental character and extent, completed in the early months of 1915 and reported in Volume 36, No. 1469.

A committee to recommend standards for use in engineering drawings to denote the materials used in construction; report published in Volume 36, No. 1468.

A committee to foster the creation and use of standards in all engineering and industrial departments. This committee is still at work.

A committee to foster standardization of sizes in the commercial literature of production and trade and other catalogues; report published in Volume 35, No. 1394.

A committee to report on the proper shapes and angles to be used in the tracing of gear teeth in the involute system.

A committee to recommend desirable changes in the patent laws of the United States.

Sub-committees under general direction of the Research Committee of the Society, and preparing to report on safety valves, on electrical materials, and on steam.

A committee to recommend a code of ethics for practising engineers.

A committee to report recommendations respecting a National Museum of the productive industries.

A committee to report standard tolerances in the fit of screw threads.

This last series of eight have been appointed by the Council after discussion of their significant value, and there are, in addition, conference committees of that body appointed to sit with committees of other engineering societies upon questions of mutual interest as respects matters of common interest. Such committees have acted on the procedure to be followed when legislation is proposed of unfortunate or ill-advised purport. The Council has also had committees recommended to it on which it has not passed favorably; and others have found it impracticable or unwise to report and their appointment has been quietly ignored and forgotten.

The Committee on Meetings has also recommended special professional committees, whose primary function is the creation of professional literature on an assigned topic, in the form of papers and discussions, and the holding of special sessions at conventions or at other times to make these public and available. The topics now crystallized from the general planning in this field include: *textiles, administration, cement manufacture, depreciation and obsolescence, machine shop practice, iron and steel, hoisting and conveying, air machinery, railroads, industrial buildings, and fire protection.* As time shall show and as the Society can afford it, there will be additions made to the list. As the permanent importance and the volume of papers gathering around each topic shall justify, the members adhering to any one topic will be formed into a professional section of the Society. It is not worth while to create and multiply sections of the

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y, when after a few papers and a limited number fessionally specialized sessions of the members in-ed, it will be found that the topic has been prac- exhausted and no more papers are forthcoming ups as previously under pressure. Papers coming and at intervals as the normal flow can best be ed in the general sessions, to give breadth of in-to them.

will be seen from the foregoing that the committee el of Society activity is one of its most useful and ve ones, and is to be warmly encouraged by legisla-nd official action. The capacity of the Secretary Society's executive is enormously multiplied by the ary service of the committee members, and the ership and the profession strengthened and ad-d by the results of this skilled and expert energy is expended for the good of all.

CHAPTER XVII

Professional Sections, Local Groups, Student Branches, Affiliates

It has already been emphasized elsewhere that the basic concept of organization and administration was that The American Society of Mechanical Engineers should be the recognized national body of its practitioners in the United States, or the North American continent. Hence any tendencies to localize it, or to give any group of its members the feeling that they were isolated from it, or did not get the same return as some others more favorably located, were to be opposed as blunders of policy.

On the other hand, to overdo this philosophy and to lean backward in an effort to be upright, by opposing local gatherings in the important centers where large groups of members have their homes and duty, would be no less a blunder. The important matter seems to be to keep clearly in view the fact that such local membership gatherings must not be claimed to be meetings of the Society; that they should not take legislative or other action representative of it, nor seek to get into control of it politically or technically. With proper safeguards in operation to these ends, the holding of meetings in the various industrial centers of the country will not only be an occasion of pleasure and value to the membership, but be of the greatest service to the Society as a whole.

The history of the monthly reunions of members during the 31st Street period from 1890 to 1907 has been elsewhere recorded. It was subsequent to the author's presidential address of 1907, in the first year of occupancy of the Engineering Societies Building, that

the plan of holding meetings in cities other than New York began to take definite and workable shape. Five fundamental principles were molded into the structure on which they were built:

(*a*) They must in no wise invade the field and function of a local society in that territory where such exists. Meetings must be held in coöperation, or as joint meetings.

(*b*) They must not be meetings of the Society, but always be called and conducted as meetings of the Members of the Society in such a place.

(*c*) The entire membership of the Society must share in any papers or other professional material of value which come to the group of local members at such a meeting, so that the good of the few may become the good of all.

(*d*) The meeting shall be in control of its own people. The Council will ask only the right to approve the personnel of the committee in charge. All expenditure properly chargeable to the Society must first be approved by its Secretary.

(*e*) All members of other engineering societies shall be invited and made welcome at such meetings, and no distinction shall be made as respects engineers, not members of any society but who would be benefited by attending meetings.

The reasons which lie behind the foregoing policies seem hardly to need discussion. Experience shows them to be sound and to work well. Under them, meetings are statedly held in Atlanta, Boston, Buffalo, Chicago, Cincinnati, Los Angeles, Milwaukee, New Haven, New York, Philadelphia, Providence, St. Louis, St. Paul-Minneapolis, San Francisco and Worcester. The Boston meetings were among the first to be organized and they have been the occasion for some excellent papers and for the presence of distinguished visitors. What may be designated as the social expenditure of the meetings is entirely in the hands of the local members, and the Society is not responsible for it, nor asked to help in it.

Such meetings or reunions of members, with a simple and unpretentious local organization for their conduct, seem to approach most nearly to ideal conditions. In some places, however, the idea of a Section of the Society seems to be preferred, and under this name the gatherings are held in St. Louis, San Francisco and Cincinnati. It does not seem material what name is used, provided the safeguards are present, and the future may manifest all geographical groups operated under the legislation for sections. If the principle of benefiting all by the activities of one section is lived up to, the geographical groups or sections should be the occasions of great professional strengthening of the Society, since papers procured by a section for itself will be read afterwards in other sections and discussed therefore with a national breadth of treatment most stimulating to think of. The Journal of the Society will be the organ and channel for such wide distribution of the papers of the sections. The one important view is to keep from considering the Society as an aggregate of self-seeking sections. The Society as a unit may subdivide for the purpose of convenient activity in smaller bodies, but the integrity and unity of the whole is a philosophic principle to be maintained.

Under this same head as the geographical groups, will be brought by logic and by polity the meetings and the organizations under the Student Branches of the Society. These are exactly like the local sections, with the limitation that the executive control and the territorial residence attach to engineering schools of recognized standing, and the meetings are primarily meetings of their students. Student members pay an annual fee of \$2, to cover the expenses of their connection to the Society and a subscription to The Journal. The Student organization in many cases is the existing engineering society, and The American Society of Mechanical Engineers only requires the privilege of approving the by-laws of such organization if its members are otherwise eligible. The graduate may retain student privileges for two years

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fter graduation, but must thereafter become a Junior Iember if he desires to retain an organic relation to ıe Society. Thirty-five Student Branches have been ɔrmed, with an enrollment soon to reach 1000 names. 'he list is subject to growth each year, but at the moment f writing includes the following: Armour Institute of 'echnology, Carnegie Institute of Technology, Case chool of Applied Science, Columbia University, Cornell Iniversity, Kansas State Agricultural College, Lehigh Iniversity, Leland Stanford Jr. University, Massa-husetts Institute of Technology, New York University, 'hio State University, Pennsylvania State College, 'olytechnic Institute of Brooklyn, Purdue University, ;ensselaer Polytechnic Institute, The State Agricultural 'ollege of Colorado, State University of Iowa, State Iniversity of Kentucky, Stevens Institute of Technology, yracuse University, Throop College of Technology, Iniversity of Arkansas, University of California, Uni-ersity of Cincinnati, University of Colorado, University f Illinois, University of Kansas, University of Maine, Iniversity of Michigan, University of Minnesota, Uni-ersity of Missouri, University of Nebraska, University f Wisconsin, Washington University, Worcester Poly-ɜchnic Institute, Yale University.

A second grouping of the elected members of the So-.ety is into the professional sections. These are formed f members interested in a subject or a department of ıechanical engineering, desirous of securing and dis-ıssing papers on a single topic or on a series of topics ɜlated to one professional line of work or achievement. 'heir organization for this purpose may be simple or ıore complex. In the simple organization and the one) be preferred, they are a voluntary body, with an execu-ve committee to manage their affairs, and with no dues nd little or no expense outside of that which the Secre-ıry's office incurs for all members in the procuring of apers to be read, their printing and publication and istribution, and the holding of occasional special ses-ions at conventions or at other times. The Council asks

only that it may control the personnel of such an executive committee, and that all expenditure be made through the Secretary and with his approval and provided for in the annual budget. The more complex organization approaches to that of an engineering society, with committees and its own officers, perhaps also with a procedure of election of members and officers, and an increased outlay for the more elaborate routine of management. In the carrying out of the simpler plan, the committees of the Society in charge of special topics are sections of the professional class, and will be so developed by procedure and legislation. The Gas Power Section is being so handled that it will gradually be transformed into a body of simpler organization and conduct, but practically autonomous under its own executive committee.

Professional sections, active and full of energy, are of the greatest practical professional significance to the Society. They secure specialized papers, they procure live discussions, and they bring into touch with the Society, its work and its excellencies, persons who perhaps otherwise could not have been interested in it.

A fourth group of persons who are brought together to serve and benefit the Society and be themselves benefited are included under the term Affiliates, and their relation is that of affiliation with The American Society of Mechanical Engineers. They are of two classes, affiliated societies, and affiliate members.

An affiliated Society is one with which the Society has the right and privilege of an interchange of professional papers. Any society may have, publish and present, any of their papers at a meeting for discussion; conversely, the affiliated society may take Society papers published in The Journal for reading and discussion. Valuable discussion is also the property of both parties to the affiliation. This policy enables the Society to be of material benefit to organizations, the scope of membership of which makes the securing of papers for its meetings not always a simple or a practical process; and

the Society broadens enormously the area from which it may draw papers, data and significant discussion.

The affiliate member is not usually a member of an engineering society, who desires or is desired to take part as by right in any engineering meeting of group or section or branch, either in presenting papers or discussing those of others, or who feels it to be to his advantage to support the work of such an organization without going through the process of election as a member of the national society. His experience or age may not qualify him for a regular grade, yet his coöperation and participation will be most valuable in the work of the section, for example. Again others, self-distrustful as to the acceptability of their experience as qualifying them for a regular membership, may like to become affiliates first as a stepping-stone to the full members' relations. From whatever cause the hesitation may come or the delay in seeking full membership by parties eligible, the affiliate relation is believed to strengthen the Society on the one hand, and to be of service to its holder on the other.

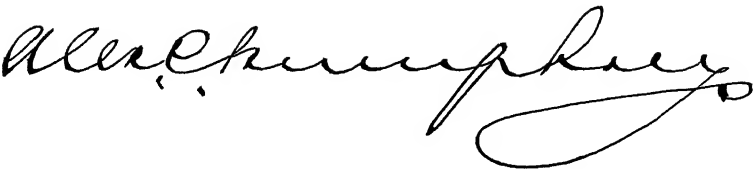
CHAPTER XVIII

Historic Gifts to the Society

Reference has been made in an earlier chapter to the fact that when the Society moved into its house at 12 West 31st Street and into an assembly hall which had been decorated with numerous life-sized portraits of eminent practitioners in medicine, the first feeling of those who dwelt in the house and made use of it was that these bare walls must be covered with memorials of those whom the profession of mechanical engineering delighted to honor. It was a significant fact voiced by Dr. James C. Bayles in presenting the portrait of his friend, Alexander L. Holley, that he hoped the gift of this oil portrait would be the first in a long line of similar gifts which would make the assembly hall of The American Society of Mechanical Engineers a sort of pantheon or hall of fame, on whose walls the portraits of eminent engineers would group themselves as the years went by.

It was along this line that the first effort to secure gifts for the Society shaped itself, in the direction of securing the portraits of those two deceased members who had been recognized by the Council as founders of the Society and made Honorary Members in perpetuity.

In reviewing the history of gifts to the Society, it would perhaps be more convenient to disregard the existence of historic succession, and to group the gifts to the Society rather along the line of their character and significance. Reference has been made elsewhere to many of these gifts as signalizing the administration of the President of that year, so that the historic and chronological features can be easily traced. On this principle the gifts to the Society will be grouped in the following classes: (*a*) portraits of eminent members,



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including busts; (*b*) equipment for the house and headquarters; (*c*) material having historic associations; (*d*) miscellaneous.

PORTRAITS

(1) A portrait in pastel of Prof. W. J. M. Rankine. This was picked up by the Secretary in 1889 in Glasgow and was considered by all who remembered Professor Rankine as a splendid likeness. It was life size and was the first portrait on the walls of the assembly hall.

Professor Rankine was the author of the textbooks used by most early engineers and which have remained classics to this day, although superseded by simpler treatises which are more easily used in teaching. Professor Rankine worked out much of the computations made for the early compound steamship engines built on the Clyde.

(2) An oil portrait of Mr. Alexander L. Holley, founder of the Society. This was the gift of his widow, who had become Mrs. Bunker. It was presented with appropriate ceremony, the address being made by the late Dr. J. C. Bayles, an intimate friend and associate of Mr. Holley.

(3) An oil portrait of Mr. Henry R. Worthington. This was presented by his son, Mr. C. C. Worthington.

(4) An oil portrait of Mr. Jos. Harrison, Jr. Mr. Harrison was the designer of the cast-iron sectional boiler which had considerable vogue, and also was known for his work in connection with the equalizing system of spring levers in locomotives and other similar work. The portrait was the gift of his nephew, Mr. Henry H. Suplee.

(5) An oil portrait of Robert Fulton, alleged by its donor to have been painted by Fulton himself at the time he was a portrait painter by profession. The portrait had been bought by Mr. Alanson A. Cary and kept in his library, until the breaking up of the home induced his widow to make a gift of the picture to the Society.

(6) An oil portrait of Dr. Franz Reuleaux. This was painted from original sittings by Miss Suplee and

presented to the Society through her brother, Henry Harrison Suplee.

(7) An oil portrait of Mr. J. F. Holloway. This was painted from photographs after the death of the subject and was never considered as successful as the subscribers to the fund had hoped it would be.

(8) An oil portrait of Prof. John E. Sweet, Past-President, later Honorary Member. This portrait was the gift of Mr. Ambrose Swasey. It was unveiled after a presentation address by Mr. Chas. Wallace Hunt.

(9) An oil portrait, three-quarters length, of Mr. John Fritz, Past-President and Honorary Member. This was a gift from Mr. Fritz which he had not intended should be made until after his death, but he was persuaded, sorely against his will, by a group of his friends to allow it to come into the Society's possession, so as to have the pleasure of it while he was still alive.

(10) An oil painting of Sir Isaac Newton, copied from the original in the National Portrait Gallery in London.

(11) A similar oil portrait of James Watt.

(12) Oil portrait of George Stephenson, similarly a copy of the London original. These three copies were presented to the Society by a syndicate of Past-Presidents, among whom were Messrs. Swasey, Dodge and others, and were copies made in London by Miss Suplee. They are among the most cherished possessions in their class, which the Society is proud to exhibit upon its walls.

(13) A crayon enlargement from a photographic original of the late John C. Hoadley. This was presented by the family of Mr. Hoadley and through the active coöperation of his son, Francis W. Hoadley. Mr. Hoadley had been a notable figure in the generation about to pass away as the Society was formed. He had exhibited at the Centennial Exposition of 1876 a form of engine in which the governing was effected from revolving weights in the plane of the flywheel and was the initial type of the single valve automatic engine. His priority in this field is disputed only in England, where

the governor of Hartnell is claimed to embody the same ideas.

(14) Oil portrait of John Ericsson. This was found by the Secretary of the Society in the collection of a dealer of antiques on the upper East Side and was bought and turned over to the Society. It was recognized by those who had known Captain Ericsson as a portrait that had hung in his parlor in Beach Street, New York, and later, on a visit of the artist Ballin, was recognized as executed by himself. It needed only retouching and repairs to the frame to be made a distinguished possession of the Society.

(15) An oil portrait from an enlargement made after death from a smaller photograph of the late George H. Corliss and presented to the Society by his widow and his estate. Mr. Corliss was asked by the Society to be its first President and previous to its formation had had a position in steam engineering which was unique and distinguished.

(16) A photographic reproduction of the National Portrait Gallery original of the portrait of James Watt. This was hung in a niche, formed when the shelving of the library gallery was installed for the portrait of the donor of the building to the New York Academy of Medicine. It retained its position all through the sixteen years of Society life in that building, even when the oil copy from the original was placed in the assembly hall below.

(17) A bust in plaster of Captain John Ericsson, presented with its ornate pedestal by Mr. James M. Dodge. This was a copy from an original made in Ericsson's early life which had stood in the library of Mr. Dodge's uncle, Mr. Mapes. The Society had it reproduced in bronze and has both the original plaster and the bronze reproduction in its present building.

(18) A marble bust of the late Joseph Nason, with its pedestal. This was the gift of his distinguished son, Mr. Carleton W. Nason, who succeeded his father in business and who was greatly interested in the Society's

work up to the time of his death. He was active in adding noteworthy memorials of interest to the Society house and in the early reunions.

(19) A bust in plaster of James Watt, but colored black, a replica from a Scotch original, reduced in size and presented by Mr. Erwin Graves. This bust was on the mantlepiece of the 31st Street house for many years.

(20) A bronze relief tablet, executed by H. A. MacNeil, in memorial of Prof. Robert H. Thurston, first President of the Society. It is a replica from an original at Cornell University, and was secured by a subscription started shortly after Dr. Thurston's death, particularly from alumni of Stevens Institute, by the energy of Mr. Gus C. Henning and an interested committee. The first offerings in the form of a bust were rejected as unsatisfactory. The present most pleasing form was secured by permission from the Alumni Association of Cornell. The bronze was unveiled in 1909 by Dr. A. C. Humphreys as chairman of the reorganized memorial committee, and accepted by President E. D. Meier.

EQUIPMENT

In the collection classed as gifts to the Society for the equipment of its house and headquarters should be listed:

(21) An oil painting representing a bold sea coast with the sea dashing against it.

(22) A landscape showing a winter scene with snow upon the ground and a cold brook running between icebound banks. These oil paintings were the gift of an interested group of members for the decoration of the Society parlor in 31st Street and were bought by the Secretary at a clearing-out sale. They hung facing each other upon the walls of that parlor all through the time of its use.

(23) A crayon showing a head of Minerva in heroic size. This was presented by the Secretary to fill a needed space.

(24) A dining table of the colonial period, once the

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property of Robert Fulton. It was given by him to Miss Egleston, and by her to her brother, Prof. Thomas Egleston, who presented it to the Society. It was an extension table made with leaves which hung or dropped when such leaves were not in use, and consisted of a center section and two rounded ends. A brass plate was inserted into the table showing its history and passage through several owners. It is interesting to record that a lady, whose Southern home had been ravaged during the march of Sherman's army to the sea, visiting the house some years after the Society came into its possession, laid claim to the Fulton table as being her property and was quite insistent until she had been shown certain details of construction which she recognized as different from her original. The table belongs to the period at the end of the eighteenth century. It had been abused by common uses in the kitchen in the old Egleston home but was easily put in order and made a distinguished ornament.

(25) The upright piano. This was the gift of members interested in the musical evenings of the first winter of occupancy of the 31st Street house and was a great source of pleasure to those who used the house as a home.

(26) The John Fritz chiming hall clock. This is a handsome modern reproduction on antique lines of the tall clock of the colonial period, bearing an inscription on a silver plate: "Oh! Time, deal gently with our loving friends, John and Ellen Fritz. August 21st, 1892, Bethlehem, Pa." It was presented to Mr. and Mrs. Fritz on the occasion of the celebration of Mr. Fritz's seventieth birthday at a large banquet given by his friends in Bethlehem, and was conveyed to the Society by his estate in 1913 after Mr. Fritz's death. It plays the Westminster chimes every quarter hour.

(27) The memorial plaque presented by general subscription to Rear-Admiral Geo. W. Melville on the occasion of his seventieth birthday. It is of silver inscribed and mounted in a frame. The recipient asked that the Society might preserve it after his death, which occurred in February 1912.

(28) Illuminated addresses of welcome, presented to the Society by guests from European countries who had been entertained by the Society, or on the occasion of such visits by the Society outside of the United States.

(29) A photograph of Sir Henry Bessemer.

(30) A photograph of Mr. Eckley B. Coxe.

(31) A photograph of Mr. Chas. H. Haswell, first engineer-in-chief of the United States Navy, and Honorary Member of the Society. These three are the nucleus of a collection, prepared under the Secretary and House Committee in 1911-1912 to include all the Honorary Members and the Past-Presidents of the Society.

(32) A combination instrument thermometer and barometer belonging to the estate of the late Mr. W. F. Durfee. This stood on the mantlepiece of the Society parlor on 31st Street for many years.

HISTORIC

In the group of material having a distinctly historic outlook come the following articles:

(33) A drawing of the date of 1813, showing the steamer Robert Fulton with design of the engine and some historic data concerning the boat. This was autographed by Robert Fulton, although, of course, it is not known whether he drew it himself or had it drawn for him. It was the gift of Miss Louisa Lee Schuyler and was one of the most interesting and valuable historic elements of the growing Fulton memorabilia in the Society's possession after an entertainment had been given with Robert Fulton and his achievements as the central features. These had great significance at the time of the Hudson-Fulton Celebration in New York in 1909.

(34) A water color drawing, also autographed by Robert Fulton and probably an original by him, illustrating the carriage of a canal by an aqueduct over a ravine and in which the power for the boat was derived by the overflow of water from the canal. This was the gift of Miss Cornelia J. Carll.

(35) A model of the Ericsson Monitor, on a scale of

one-quarter of an inch to the foot. This was presented to the Society by Thomas F. Rowland and his associates of the Continental Iron Works at Greenpoint, Brooklyn, in the shipyard of which company the hull of the Monitor had been constructed. The model was suspended under the Ericsson portrait for many years.

(36) A model of the steam yacht Reverie, made from the designs of Mr. G. W. Hillman for Mr. Stephen Wilcox. When the yacht ceases to be in existence it will become a historical model. The model has been loaned to the later owner of the vessel, Mr. A. F. Hoxie.

(37) A photograph of the first Straight Line engine constructed by Professor Sweet in his works at Syracuse, showing the engine body and details of the shaft governor. This was presented by R. H. Davis and is exhibited under a yellow glass, with the hope that the use of a non-actinic medium may prevent the fading of so valuable an original.

(38) The first hydraulic jack made by the late Mr. Dudgeon, to illustrate the principle of that machine. This was a gift from Mr. F. H. Stillman.

(39) A lathe tool such as was used by the early mechanics before the invention of the mechanically operated tool carriage and used in all work of engine turning, screw cutting and the like. This tool had been known and used by John Fritz in his apprenticeship and was steadied by having its wooden handle long enough to go under the arm of the worker while he controlled the point with both hands.

(40) A silver cup presented to Captain Ericsson after the success of his Monitor by those who recognized the debt which the nation owed to him when the Monitor prevented the entire United States Navy from obliteration. This was a permanent loan, equivalent to a gift from Mr. Ericsson Bushnell.

(41) A specimen of boiler scale taken in the rough from the water tube of a marine boiler of 1876, and cut into its present form and presented by Mr. Charles H.

Haswell. The sample of scale is about two inches thick and is as hard as rock.

(42) A sample of armor plate, showing the marks of shell impact, taken from a monitor which was cut up by the Tredegar Iron Works of Richmond. Presented to the Society by Colonel W. R. Archer.

(43) A set of Whitworth plug and ring gages, brought from England about 1856 and used by Mr. Aaron M. Freeland for many years in his shops in New York City. These were probably the first set of gages to be used in this country. The gift was received from the Ingersoll-Rand Company.

(44) A similar set of Whitworth gages for screws.

(45) A most valuable set of models to illustrate the inventions and experiments of Captain Ericsson in connection with his work on the hot air engine and solar motor, and other objects of his inventive capacity. These were presented by his executors to the Metropolitan Museum of Art in New York City because at the time of his death there seemed to be no appropriate place where they could be preserved. By arrangement with the executors of Captain Ericsson's estate and the trustees of the Metropolitan Art Museum, this set of models and the case containing them were presented to the Society and are exhibited in the United Engineering Society's fireproof building.

(46) By the generosity of Mr. Stephen W. Baldwin and some other friends of the late Mr. J. C. Hoadley, a large proportion of his apparatus for testing boilers and engines was purchased from his estate and presented to the Society. Some of the elements of this gift were so valuable that one by one they were stolen from the Society's collections. Others which had no great value were loaned to members of the Society and to university laboratories, where they still remain. Others are still in use in the Society's offices.

(47) A pair of Novelty Iron Works or Stillman indicators of the James Watt design, with no lever-multiplication for the pencil motion. Presented by Mr. John

C. Kafer, then engineer with the Morgan Iron Works of John Roach's Sons, which had bought out much of the tools and other property of the Franklin Forge and the Novelty Iron Works of New York.

(48) A gear cutter of 1848, made and used at the works of Russell, Birdsall and Ward, Port Chester, N. Y., presented by Mr. A. D. Finley of the Society. The cutter was formed on a lathe by hand tools and the teeth were cut by a file. Most of the work was chipped by chisel and finished by a file, as the works had no planer or shaper for this class of work. The machine was designed by Mr. W. E. Ward, former member, and used under his supervision.

MISCELLANEOUS

In the miscellaneous collection of gifts which are not historic are the following:

(49) A set of Pratt and Whitney gages for standard machine screw threads.

(50) A model made by the Pratt and Whitney Company of the breech loading gun, known as the Long Cecil and made in Kimberly, South Africa, during a siege of 1899-1900 in the absence of any adequate tools or machinery for such manufacture. Presented by the Pratt and Whitney Company.

(51) A model of the Buckeye steam engine showing its characteristic valve gear with a double movement.

Among the miscellaneous gifts also should be mentioned a copy of the special book prepared by Captain Ericsson at the time of the Centennial Exhibition in 1876, when certain models and machinery which he had desired to exhibit were refused for reasons which seemed inadequate to him. Only a few copies of this publication are in existence and this copy was presented to the Society by Mr. A. H. Raynal.

The collection of unique books in the Durfee library with the enclosing book cases are not a gift, but should properly be listed among the material the Society possesses which is of unique value.

Photographs from the Walker Manufacturing Company of the cable railway machinery which they manufactured previous to the supplanting of cable motive power by the electric motor system. These units are already historic.

Photographs or other reproductions of the achievements of members in pumping engines, steam engines and other mechanical creations.

If it should come to pass in the future that room should be found for anything approaching an adequate engineering museum, the collection of apparatus accumulated by the Society during its years of formation will be of the greatest significance. Americans have been so busy creating new elements that historic forms are turned out and find their way to the scrap heap before their real historic value is realized. There is at Columbia University the original single valve automatic engine made by Mr. J. C. Hoadley, exhibited at the Centennial Exposition in 1876. There is also an exhibit of the Ericsson hot air engine of his early design. Unfortunately there is no room for their adequate display and their existence is unknown to many. A museum for such historic specimens exists in Munich, Germany, and it is greatly to be desired that a similar undertaking should be begun at once in the United States.

James Hartness

PRESIDENT 1914

OF

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

CHAPTER XIX

Prizes and Medals

A further and important activity in the Society has been stimulated by the gift of generous and far-seeing members, either by deed of gift in their lifetime, or by bequest in their will. These funds are held in trust by the Society, the income to be devoted to stimulating activity in a chosen direction.

The first of these are two prize funds of $1000 each given by Mr. Henry Hess, a Vice-President of the Society. The first is for a prize for the best paper by a Junior member of the Society. The second is for the two members of Student Branches of the Society who shall contribute the best papers in any year. It is the purpose of these funds that they should be of valuable aid to the young engineer, to make it possible for him to undertake original work and present the results of such investigation in well-considered papers. The decision of award is made by three members of the Society, not members of the Council but appointed by that body, and including one member of the Committee on Meetings. The prize is to consist of $50 in cash and an engraved certificate signed by the President and Secretary and shall be awarded only in case the paper in competition is adjudged to be of sufficient merit as a contribution to the literature of the profession.

The committee on award for the prizes for Student Branches is to consist of three, one of whom shall be the Chairman of the Committee on Student Branches. The honorary presidents of the Student Branches shall act as advisory members to the Committee on Award. Each prize of the two given to students shall consist of $25

each in cash, with an engraved certificate signed by the President and Secretary of the Society.

Rear-Admiral George W. Melville, Past-President of the Society and Honorary Member, created by will a trust fund to be held by the Society, the income to be devoted to a gold medal to be awarded by the Council for the best paper or thesis on any mechanical subject. It will be known as the Melville Medal, but the rules for its conferring have not been entirely formulated.

CHAPTER XX.

The John Fritz Medal
United Engineering Society

In addition to these activities which are purely personal, The American Society of Mechanical Engineers has united with other bodies for the joint prosecution of matters of common interest. The first of these is in the consideration and awarding of the John Fritz Medal. The second is its participation in the United Engineering Society.

The John Fritz Medal is a gold medal presented for achievement in applied science, as a memorial to the great engineer whose name it bears. In 1892, just after Mr. Fritz's seventieth birthday, a number of his friends, representing membership in all the engineering societies, united to tender him a dinner in celebration of his birthday. The dinner was held in the opera house of Bethlehem, Pa., Mr. Fritz's home city and the affectionate devotion of all who were assembled centered in a mock trial after the banquet. The victim was accused of having made the City of Bethlehem a place where grass no longer grew between the stones in the streets and a place where the meadow by the river had no longer an opportunity to feed the common or bucolic pig because of the enormous production of pigs of another sort which was a feature of that area. He had, it was alleged, made hollow forgings so that the content of phosphorus might escape through the hollow of the mandril through which they were forged, and there were other high misdemeanors of success with which he was charged.

In 1902 when his eightieth birthday was approaching, the idea of a similar celebration and social event was

canvassed, but in view of the merely temporary and effervescent character of such a celebration, there was born the larger concept of a fund, to be subscribed by the same persons who would attend such a dinner, the income to be used in creating each year a John Fritz Medal for scientific and industrial achievement in any field of pure or applied science. The idea was received with acclaim and the fund necessary was raised in a very short time. The names of subscribers to the fund are on record in an album which the executors of Mr. Fritz have turned over to the Society for safekeeping. A committee was appointed consisting of representatives from The American Society of Mechanical Engineers, the American Society of Civil Engineers, the American Institute of Mining Engineers and the American Insitute of Electrical Engineers. This Committee secured an appropriate design of a medal by Mr. Victor D. Brenner and the first impression from the artist's design was cast and given to Mr. Fritz himself, at an important dinner held in the Waldorf Hotel, New York, which strained the capacity of the great ballroom to its limit. After the die of the medal had been completed, the Committee which had been appointed by the several societies was continued as the John Fritz Medal Fund Corporation. Four members from each of the engineering societies named above are appointed by the governing board of such society to serve for four years. The medal has been awarded to John Fritz, Lord Kelvin of England, George Westinghouse, Alfred Noble, Charles T. Porter, Sir Wm. H. White of England, Thomas A. Edison, Alexander Graham Bell, Robert W. Hunt, John E. Sweet and James Douglas. The representatives on the John Fritz Medal Board have been Messrs. Ambrose Swasey, Henry R. Towne, John R. Freeman, W. F. M. Goss, F. R. Hutton and John A. Brashear.

The United Engineering Society is the name which has been given to the Board of Trustees which represents the three founder societies named in Mr. Andrew Carnegie's deed of gift of the sum to build a union building.

Jno A Brashear

PRESIDENT 1915

OF

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

The conference committee named in 1904 to confer with the representatives of the other societies became the building committee after the special charter was granted and the plans of the building were to be decided upon. The building committee again became the representatives of the Society on the Board of Trustees and under the charter granted by the State of New York for the control of that building. The first members were Messrs. James M. Dodge, Charles Wallace Hunt and F. R. Hutton. These served two terms. Subsequently, Messrs. Jesse M. Smith, Fred J. Miller and Alex. C. Humphreys have been chosen Trustees and Prof. F. R. Hutton has been Secretary of the Board by successive re-election under its by-laws. The Board of Trustees consists of nine members, three appointed from each of the three founder societies and each to serve for three years. It is their province to conduct the building in the interests of the founder and associate societies, to build up the engineering library and to foster and favor the interests of the engineering profession in every appropriate way.

The Board has been made the custodian of the funds given by Mr. Ambrose Swasey in 1914-1915 to establish The Engineering Foundation, and its organization and functions are emphatically suggestive of the tendency towards unity and coöperation for the common good in the various branches of the profession of engineering.

APPENDIX

It has been thought desirable that the address of Prof. F. R. Hutton on retiring from the presidency in 1907 should appear as an appendix to the volume of the Society History. It was delivered as the results of his many years of study and effort in the work of administration of an engineering society and covering discussions of certain philosophies of which the History gives only a summary treatment. It gives also the lines of development of the profession of mechanical engineering in the thirty years since the date of the Holley address in the field of mechanical engineering, as he then saw it in 1880.

THE MECHANICAL ENGINEER AND THE FUNCTION OF THE ENGINEERING SOCIETY

President's Address. 1907

By PROF. F. R. HUTTON, E. M., Ph. D., Sc. D., NEW YORK

The convening of The American Society of Mechanical Engineers for its Annual Meeting in the splendid building devoted to the needs and uses of such a Society and for the first time in such surroundings makes it seem fitting that the opening address of the meeting should consider the duty and function of the engineering society in its relation to the profession which underlies it. The speaker takes special pleasure in availing himself of this opportunity by reason of the many years of his service to such a Society and of the close touch permitted to him for this reason with the problems which the topic presents.

It would be an attractive possibility to consider the wide range of the Engineering Societies as they are grouped under the roof of this Engineering Building, and to discuss their functions with respect both to their own specialties and to the profession as a whole. This would open up the possibilities of the building and the significance of it as a gift to our profession in a way which would be both stimulating and suggestive; and would present the greatness of the thought in the mind of its donor in a way to make it remembered. But the limitations in space and time and the proprieties of the case make it appear fitting to confine consideration to the one field of the Mechanical Engineer, and to the function of The American Society which bears his name. This simplifies the questions into two: What is the mechanical engineer at the opening of the twentieth century; and, what are the duties and functions of an American Society of Mechanical Engineers to that branch of the profession? This latter logically divides into two sections; the duty of the Society to those without its membership; and the duty of the Society to those enrolled within it.

In seeking a defensible definition of the mechanical engineer in these days, which are those of specialization on the one hand and of broadening scope upon the other, there are several courses open. The first and obvious one is to rest upon authority and inheritance and to follow recorded standards which

Presented at the New York Meeting (December 1907) of The American Society of Mechanical Engineers, and forming part of Volume 29 of the Transactions.

have some vogue or acceptance. The second is to gain definiteness of thought by differentiating the mechanical engineer from other specialists by noting what lines of professional activity are *not* his; and the third will be to scrutinize the list of membership in the Society and so dividing the members into groups to generalize therefrom as to what the man is doing who is or claims to be a mechanical engineer.

In turning to the historical definition, or that which has its authority from long usage, the stately language of Tredgold of England always claims first place as of right. At a meeting of the Council of the Institution of Civil Engineers of Great Britain on December 29, 1827, Mr. Tredgold, Honorary Member of the Institution, was requested by resolution to "give a description of what a Civil Engineer is," in order that this description might be embodied in the petition for a charter for such a body. Mr. Tredgold's historic definition is:

"Civil Engineering is the art of directing the great sources of power in Nature for the use and convenience of man." He amplifies this by adding that it is a practical application of the most important principles of natural law, and has among its objects that of improving the means of production and of traffic for external and internal trade, such applications being directed to the construction and management of roads, bridges, railroads, aqueducts, canals, river navigation, docks and store houses, ports, harbors, breakwaters, moles and lighthouses. He includes also the protection of property from injury by natural forces, as in the defense of tracts of land from encroachments by sea or rivers: the direction of streams and rivers for use either as powers to work machines or as supplies for towns or for irrigation, as well as the removal of noxious accumulations as by drainage. He touches also upon navigation by artificial power for the purposes of commerce, and adds that the scope of utility of engineering will be increased with every discovery in natural law and physics, and its resources with every invention in mechanical and chemical art. The Charter of the Institution repeats the Tredgold wording, and describes the profession of the civil engineer as "the art of directing the great sources of power in nature for the use and convenience of man, as the means of production and of traffic in states both for external and internal trade as applied in the construction of roads and bridges, aqueducts, canals, river navigation and docks for internal intercource and exchange and in the construction and adaptation of machinery and in the drainage of cites and towns."

In comment upon this definition it may be observed:

a It should receive the respectful homage which is due to a great achievement. Its breadth and comprehensiveness show us how great was the man who created it, and so early in our industrial history. By suitably extending the meaning of its terms and by reading into them the fuller significances of the later years, the definition is still defensible for what it can be made to cover. We have not outgrown it yet, by any means.

b It should be regarded as a definition of engineering in its broad and comprehensive sense, and should not be used to apply only to that specialized department of the profession to which in America the term civil engineering is applied in education and in popular use. What Mr. Tredgold meant was the profession of the civilian practitioner of engineering, as distinguished from the military engineer, the latter being concerned with the special problems of the fortress and the work of the army. The civilian and the military engineer have much the same problems in any case, and the military engineer in the field of ordnance becomes perforce a mechanical engineer of high order,[1] but the purpose of the Tredgold definition was to form the basis of a character for an organization of civilians as differentiated from employees of the British Government in their own engineering field; and the qualifying word applied to the engineer should be so understood in the light of its purpose.

c In the third place it should be noted that this definition of engineering as practised by the civilian was given in the infancy or at the birth of the modern industrial epoch in which we are now living. This constitutes an element of the admiration we must feel for the greatness of its creator, that under these conditions he should have seen so far; but the fact is also responsible for the limitations which are suggested by it and which must be removed in the light of our present clearer vision. The year 1827 was two years in advance of the competition at Rainhill where Stephenson won fame for the solution of the motive power problem of the railway: the first power driven steamboats on the Thames had been struggling against the tides only since 1813, and Dr. Dionysius Lardner had convinced all conservatives that the consumption of fuel as the standard then existed would preclude all successful working of long distance marine service such as across the Atlantic Ocean or around the Cape. The machine tool was still a small thing, whose tools were held by hand to the work to be done. Engineers were highly pleased when the fit of the engine-piston in the bore of the cylinder was so close that "at no point in its circumference or traverse could you drop a shilling through the space between the two." The mining of England while important relatively was yet limited for lack of shaft-machinery and was largely or entirely carried on by mine-bosses of experience. Faraday had yet four years to labor before he made his historic discovery of the electric current induced by motion before the pole of the magnet. The metallurgist and chemical engineer could only come into being when the needs of a community, built upon industrial production with cheap power at its base, should have called for him. What did exist were mills driven by water-power: the iron works built upon the puddling and rolling processes originated by Henry Cort, and the achievements of Boulton and Watt in respect to

[1]See paper by Brigadier General William Crozier, p. 65, vol. 29.

stationary steam engines. Nasmyth with the steam hammer and the large machine tool were still in the future; but most of all and most significant of all from the present point of view, the idea of manufacturing or production upon a large scale, in factories or shops where great groups of productive machinery were gathered together to be served by a common source of mechanical power had not yet been born. The industrial community or civilization made possible and present by the combined achievement of the physicist, the mechanical engineer and the electrical engineer, in whose power house and from it are liberated, generated and transmitted the vast volumes now in use of industrial energy is truly dependent upon the powers of nature controlled and directed by engineers. The implication is however that these forces of nature are in existence and active and are awaiting control and direction. The definition is silent upon that group of engineers concerned with the liberation, the generation and the transmission of forces which are potential and are not realized in nature until in accordance with natural law some engineer has caused them to appear.

d Again, it is only by a great stretching of the inclusive character of terms, that the expression ''powers of nature'' can be made to include the forces which are economic or social or psychological in their application, and which come into play for control and direction when production on a large scale is under consideration, and large numbers of human beings become the organs or implements of the factory as a tool for production. The aggregation of power, machinery and producers is a unit; it is to be created, organized and operated for an end. By whom? The ordinary commercial or financial or business training alone is not adequate for proper direction and control: the learned professions of law, medicine or divinity are not suggested for the purpose; but as the engineer has created the plant in its physical aspects, he would seem the proper one to operate it in its industrial functions. The engineer has therefore become an economic factor as he was not conceived to be in that earlier day. The energies directed and controlled by such an engineer may only be included within the ''powers of nature'' by an effort which strains their meaning to the breaking point in unfriendly hands: he is yet a director or controller of forces, and of no insignificant type.

e The inclusion of the powers of nature within the scope of the elements of the profession of engineering carries with it the utilizing of the resisting forces created in the materials of engineering when such powers are exerted to deform them. Engineering, therefore, correctly covers the creation of structures to resist the dynamic action of forces, meeting by the principles of statics the impact or action of impressed energy. The definition might properly be extended, therefore, to cover both the adaptation of the physical properties of the materials of nature or manufacture to the withstanding of stress, and the direction and control of forces.

f Finally, he who commits himself to the splendid Tredgold definition must take its alleged defect with its excellency. It is that it includes as engineers not alone those who create and install apparatus to control and use the powers of nature, but those also who direct and control the machines or apparatus when created and installed. This will include those who may be called "coördinators of design," who take the boilers, engines, dynamos, condensing apparatus, piping and pumps which are on the market, and combine these into a consistent whole. They have not designed any of the units themselves, or created a new machine, but they have created a power house, and are utilizing the powers of nature for the use and convenience of man. Somewhat under the same category is he who receives the finished power house with all its units from the foregoing type of engineer and his allies, the contractors who have done the construction work, and is then and thereafter entrusted with this upkeep, repair and continuous operation. Such a man also directs and controls the powers of nature, albeit on a less exalted plane than the creator or designer or the coördinator. There are those who would make the coördinator appear as a mere purchasing agent, and the operator as a mere craftsman, and neither an engineer. I cannot agree with them, believing that their function calls for skill and acquirement of a high order. The historic definition unquestionably provides for them.

g If the writer may modestly put forward a suggestion for a revision of the historic definition, he would word it: "The Engineer is he who by science and by art so adapts and applies the physical properties of matter and so controls and directs the forces which act through them as to serve the use and convenience of man, and to advance his economic and material welfare."

h It may be of interest to add that the accepted dictionaries of the day, the Century and Standard, define the engineer as one versed or skilled in the principles and practice of any department or branch of engineering, deriving the word from older forms which means he who makes or uses an engine. Engineering is further explained as the science and art of making, building, or using machines and engines; or of designing and constructing public works or the like, requiring special knowledge of materials, machinery and the laws and principles of mechanics. Both give as a secondary meaning, one who runs or manages an engine. Both the French and the Germans avoid this latter double use of the word by calling the practitioner of this sort of engineering a *machiniste* or a *maschinist*. The French also have the word *mechanicien*. The dictionary phrases are a little hard on the mining engineer, for example, who is scarcely visible in the description.

This leads up naturally to the differentiation of the mechanical engineer from those versed and skilled in other branches.

In making the following classification it is obvious that unanimity cannot be secured from all as respects the number of branches to be

recognized. With this apology and for the purpose in hand there are at least thirteen:

a The mining engineer and his close ally, the metallurgical engineer, is concerned with the discovery and the winning and extraction from the earth of its buried treasures of oil, fuel and rock. He touches the geologist and mineralogist on one side of his functions, and the chemist upon the other. Midway he allies himself to the machanical engineer for the power to overcome his resistances and to the electrical engineer for its convenient transmission to the working point. If he concentrates his ore after winning it from the earth he calls again for his machinery upon the mechanical engineer. His profession passes at one limit into the craft of the quarryman; and the other, he calls on the art of the civil engineer for his tunnels and for his shafts; or the tunneling and shaft work of the civil engineer is done for him by the miner. The metallurgical engineer who transforms the crude ore into marketable metal or into the merchant form or structural shape is allied to the chemist upon the one side for his processes and to the mechanical engineer upon the other for his machinery. The electrical engineer is more and more furnishing him the energy for conversion by heat through electrical channels, the mechanical engineer furnishing the latter his power. The mining engineer may be both miner and metallurgist. The iron and steel metallurgist is usually a mechanical engineer.

b The electrical engineer is primarily entrusted with the transformation of mechanical or chemical energy into electric form, and its transmission in that form to the point of use, where it will be again converted into some other shape. The electrical engineer has made his own the questions of generating such electric energy for the solution of the problems of lighting, transportation of passengers by railway, and communication by telegraph and telephone. He touches the physicist in the realm outside his applications of science, and has the mechanical or hydraulic engineer next to him to supply mechanical energy to his generator, and the mechanical engineer beyond him, where his energy drives the tool, or operates the pump or the elevator. Where his energy is made to appear as high heat, he serves the metallurgist, the chemical engineer; where it appears as low heat or as light, he serves the individual members of the community directly, as he does in the problem of communicating speech. His field is very definite.

c The naval engineer and marine architect is a specialized mechanical and structural engineer. His hull is a truss unsymmetrically loaded and variably supported: his motive power a definite yet widely diversified problem. He covers in addition a wide range of special problems when his vessel is also a club house or hotel, on the one hand, or a powerful fighting machine upon the other.

d The military engineer must cover both the defensive and the offensive department of his avocation. On the one side he is a structural engi-

neer, and the problems of effective transportation enter his field, which he therefore shares with what is usually called the civil engineer. On the side of attack, the problems of ordnance both for its construction and for its operation take him into the field of the mechanical engineer and electrical engineer, and his problems touch those of the physicist and the chemist and the mathematician on the research and theoretical side. In fact the problems of the military engineer are probably those in which the solutions offered by pure theory can be most directly utilized of any presented to the engineers, inasmuch as questions of cost and of financing are usually secondary for him. If the result is worth attaining at all, the national governments will always be among the most lavish spenders.

e The chemical engineer is a new applicant at the door of professional recognition in certain quarters. He is the engineer in charge of production or manufacture where the process or the product, or both, are chiefly or entirely dependent upon the theories and practice of chemistry. He shares his field with the metallurgical engineer as respects the manufacture of metals; he is a mechanical engineer as soon as the plant becomes large enough to warrant the application of power and machinery to the mechanical handling of his product. Gas-plants, sugar and oil refineries and the straight chemical manufacturing corporations call for such a man, whatever his designation. It would appear, however, that the normal tendency of growth and development in this field will be toward the utilization of two types of man. The one will be the chemist and the scientist; the other will be the mechanical engineer and executive. It may easily happen that in the days of small things the two sets of duties may devolve upon one man; later on it will be found that the best qualifications for both duties will not be found in one individual, and the volume of duty becomes too great for one man to be effective in both. When separated, the cleavage will be along the above lines.

f The sanitary engineer is a specialist in hydraulic engineering in the applications of water supply and drainage as means to secure the well being of the community as respects its public health. His field expands from that of the wise precautions respecting the piping of the individual house, where he touches the craftsmanship of the plumber, up to the broadest problems of sewage disposal and utilization, and the healthful supply of potable water for cites, free from bacterial or inorganic pollution at its source or in transit. His co-workers are the bacteriologist and the physician. It would seem more serviceable however for the purpose in hand to group such men with what are hereafter to be called the civil engineers.

g The heating and ventilating engineers, making a specialty of the sanitary requirements of enclosed houses as respects their fresh and tempered air supply, are really sanitary engineers, having however an outlook

and a relation to mechanical engineering in the appliances of their function rather than toward civil engineering.

h The refrigerating engineer is concerned with the transformation of mechanical or heat energy so as to lower the amount of such intrinsic energy in any material or space. He is most unassailably a mechanical engineer.

i The hydraulic engineer is of two groups. The one type concerned with the problems of the river or canal for navigation or for power with the dam and its accompanying details of water ways and controlling gate houses and sluices; and with the gravity storage and distribution by mains of the city water supply has plainly his outlook toward civil engineering. The other type, concerned with the water motor and its attached machinery for its operation; with the mechanical handling of water for city use or for power in industry, the designer of pumps and hydraulic utilization machinery has his outlook equally definite upon the field of the mechanical engineer. The future is likely to see this differentiation emphasized, the one class calling himself a civil and hydraulic engineer, and the other class a mechanical and hydraulic engineer.

j The gas engineer has two sets of problems: The one is the intra-mural manufacture and storage of his product, where his functions are those of the chemical manufacturer, and he should be both chemical and mechanical engineer; the other is the distribution problem for whose solution is required the skill and knowledge of a type which is unnamed, but which logically in parallel with the hydraulic engineer above, should be called the pneumatic (or gas) engineer. Industry has never stopped to be logical however, and the pneumatic engineer should be a name to suppress. The future will doubtless widen the scope of the gas engineer to cover the plants which make and use fuel gas for power and heating in units not so large as those on the municipal scale now in evidence for lighting mainly. Such creators and engineers for heat and power will plainly belong in the mechanical field.

k There is no recognized group of engineers of transportation, or transportation engineers. Such a group obviously exists, however, whether or not the name is attached to an organization inclusive of all, or is in general use. Such are the engineers of motive power on the steam railways, with the master mechanics and the signal engineers and the operative class on locomotives; such are the street railway engineers; the car builders; the maintenance-of-way engineers, the bridge engineers, the engineers of floating equipment. From the bottom of the rail upwards, these have their outlook on mechanical or electrical engineering; from the bottom of the rail downward, upon civil engineering.

The foregoing grouping does not claim to be exhaustive nor inclusive of all subdivisions of engineers even so far as it has gone. The current activities of the Engineering Building reveal bodies of municipal engineers, of illuminating engineers, of engineers concerned in fire protection, and

many others. But the purpose has been to clear the way for the separation of the two most closely allied in function and service, the civil and the mechanical engineer. The civil engineer is confessedly differentiated from the electrical and from the mining engineer: he has been more and more utilizing the achievements of the mechanical engineer, or the latter has been invading the former field of the civil engineer.

It is plain that to the civil engineer belong as of right all problems relating to the canal, the lock, the river, the harbor, the dock, the sea-wall, the break-water, the highway, the aqueduct, the bridge, the viaduct, the retaining wall, the permanent way of the railway below the foot of the rail. He also has nearly the whole of the municipal problem in streets, sewage, distribution of water; the location of railways, with geodetic and other surveying are his. He has the foundation of structures in any event, but may have to share the roof and the skeleton steel frame with other specializations. Tunneling is usually done by civil engineers, although it was originally a mining engineers' prerogative.

To the mechanical engineer on the other hand, belong as undoubtedly, and as of right the problems of the generation of power in power houses and power plants, and its transmission to the operative point unless this latter is done by electric means. It is a fair question, however, when the electrical engineer simply transmits energy generated by the mechanical engineer and utilized in industry by the latter after transmission, whether the electrical engineer as an engineer of transmission is not for the time a mechanical engineer. If the transmission were by compressed air on a sufficient scale, calling for a specialist in that field, would such a man be called a compressed-air engineer?

It is also plain that to the mechanical engineer belong all design, creation and manufacture of tools and machinery. This makes him therefore the natural administrator or executive of the production processes involving the use of machinery in factories and mills, and it is here that he finds his broadest scope and widest opportunity, as will be further demonstrated hereafter. As creator of machinery he will be a draftsman or designer of a producing plant: as operator of the plant considered as a tool for production, he will be a general manager or superintendent, or will perform these functions as owner or as president, vice-president, agent, secretary or treasurer. As a productive of power, the railway will make the mechanical engineer their superintendent of motive power, and the rail and joint become also responsibilities of his; as administrator of men and machinery, he becomes master mechanic of the railway and more and more such engineers are chosen to be general superintendents. The automobile or motor vehicle engineer is of course a mechanical engineer. From his knowledge and special training he becomes the inspector and tester for all departments of mechanical production.

But this relation of engineer of production borne by the mechanical engineer is at the bottom of very notable developments of progress. As the scale of production increases with the aggregation of capital invested,

the permanence of the business becomes inseparably bound up with the satisfactory quality of its output. Hence there grows a system of business in which the reputation of the producer becomes a factor compelling him to satisfy the buyer as respects the engineering excellence of his purchase; and it becomes possible for the contract between the two to be based upon the specifications created by the producer or seller, and not by the engineer of the buyer. This makes for cheapness and promptness of production and delivery, since standard articles become possible and frequent. It is a system lying largely at the base of the American success in competition in foreign markets, as it differentiates our practice from that of England for example. It points to a narrowing of the scope of the office of consulting practitioner as compared with the widening scope of the manufacturing engineer. It marks a broad differentiation between the civil and the mechanical engineer, in that the former never or very rarely attaches himself to a producing interest. He serves a municipality, a corporation or an individual always as a representative of their interests as a buyer or user. It is his function to see that specifications unfriendly in intent to the interests of the seller are carried out by the latter. The engineer of production is called on to originate his specifications and to enforce them in production, in order that the guarantee of quality and of economy in use may both be satisfactory to such user. The entire point of view of the two types is radically diverse.

This achievement of the manufacturing or production engineer gives significance to the work of the considerable group of mechanical engineers, who have been earlier designated as "co-ordinators of design." These are they who take the satisfactory designs or creations of the producing engineer and combine such elements into a unit for some industrial purpose. It would be foolish and unwise for such men to pass by existing standards upon the market and create special designs of their own. These latter would not only be more costly to pay for, but their delivery would be slower, and problems of repair and replacement be many times more difficult, costly, and delaying. Their creative function as engineers however is different from that of the producing engineer proper; yet to succeed demands the same faculty of critical selection and of adaptation of means to ends upon a basis of sound science which distinguishes the other group. To them belong those engineers of operation and development of existing plants, who rarely create, but who skilfully select and adopt and combine.

This economic condition also has given rise to a group of engineers properly mechanical, who are directly and productively related to the producing corporations as their representatives in their selling organization over a large territory. It is unfortunate that these men of professional standing and of engineering qualification should be so often called "Sales Managers." It is their duty to act exactly as the coördinator of design does in his office, and secure for the intending purchaser an engineering solution for his needs which shall be satisfactory to him. His value to the producing corporation is inevitably measured by the number of contracts

which he brings them: his value to his clients is measured by the engineering value of the specifications upon which such contract is based. The mere salesman could not perform the duty of the case, unless the buyer were protected by a consulting engineer. It is economically to be preferred as above, to have the specification emanate from the seller.

And finally, the group of engineers of production must include the industrial engineers who are organizers of men or departments or works as tools of production. These men are not creators of visible machines embodied in steel or iron, which perform material functions before our eyes. Yet are they creators of power and directors of forces under the fundamental definition. They may do this as independent consulting engineers from an office relation; or they may be continuously employed for this purpose by one producing concern. In either case their successful achievement is the same in principle and in result as that of him who devises a new automatic machine by which output is increased and cost of production cut down.

The final criterion or touch-stone for all these claims for the scope and function of the mechanical engineer must be the answer and attitude of the profession itself. The American Society of Mechanical Engineers exists to promote the Arts and Sciences connected with Engineering and Mechanical Construction. The Member must be competent to take responsible charge of work in his branch of engineering as designer or constructor, or he must have served as a teacher of engineering. The Associate must be competent to take charge of engineering work or to coöperate with engineers. This brings in the journalist, the patent lawyer, the business man, the contractor. The Junior must be either an engineering school graduate, or have had such experience as will enable him to fill a responsible subordinate position in engineering work. Candidates must be proposed by members of the Society, supposedly familiar with its functions and standards, and such proposers are called on to answer searching questions by the scrutinizing Membership Committee of five. The Committee on Membership reports recommendations of qualified persons to the Council of the Society, who again scrutinize the list, and it is finally submitted to the entire voting membership by letter ballot, with privilege of rejection by a limited number of adverse votes on any name. Hence it may be assumed that the membership contains only those whom the administration of the Society and its active membership regard as suitable members of a Society of Mechanical Engineers.

Who are these members, and what are they doing? The actual list of members enjoying the privilege of membership is increasing month by month, so that the figures for the autumn of 1907 are correct for only a few days. Taking the membership in the summer of 1907 as 3152 and neglecting the foreign or nonresident membership of 175 from the count and correcting the remainder for deaths, a total is used for the present purpose of 2957, in all grades. The list has been then carefully scrutinized and classified as given in the published catalogue respecting avocations. The grouping for the purpose in hand has been into the following classes:

a The Unclassifiable: made up of members who have retired, or who are not in practice or whose record in the list is a mailing address only, and their sphere of activity unknown to the writer; these are 306. If the groupings were more nearly of a size, this number might hold a balance of preponderance which would disturb the later conclusion. As the matter stands, however, the number is not a material factor, since in all they number only 10 per cent.

b The army and navy engineer 11, and the marine engineer 18.

c The hydraulic engineer 12.

d The patent attorney, solicitor and expert 25. Doubtless many engineers grouped later under Office Practitioners are also engaged in this same department.

e The technical journalist, editor and contributor 30. These men have a wide familiarity with engineering matters and expert knowledge.

f The mining engineer and metallurgist 31. This includes the type following mechanical engineering at mines or at the metal producing plants other than steel works. These last have been called manufacturers.

g The contractor 48. He is a man who is a business man for the profit of the thing, but who makes his engineering knowledge, skill and experience contribute to his business. Such are the men who build great railway terminals and do their own engineering in connection with the undertaking.

h The testing and inspection engineer 49. He acts either for a producer, or as a consultant for the buyer.

i The operating engineer 55. He is the man to whom is entrusted a plant, to operate and bring results from it. He may be a creator, or he may make effective the creations of others. He is in charge of power houses, street railway systems, institutions, factories and the like. The sea going engineer and the railway engineer might be added to this class.

j The locomotive and railway engineer 57. This is the motive power man, the locomotive designer and builder, the railway shop superintendent and master mechanic and all others concerned in the power end of the railway business.

k The electrical engineer 65. These are the power plant experts, the street railway engineers who are not power plant men, and a few of the engineers connected with the great electrical producing companies. Most of the latter however from their position and duties will be included in the manufacturing class. That they are manufacturing electrical equipment is a mere accident of the present demand and they are not electricians so much as producers.

As respects many of the foregoing and their representation in this Society, it must be noted that great numbers will owe a primary allegiance to other bodies closely related to their specialty. Their membership in this Society is an extra adherence for reasons of greater or less personal weight.

l The professor or teacher of engineering 185. This is a large group, probably larger than in any other similar body, and for the reason

that through the Middle West the state college is very strong in its industrial and mechanical departments, and its officers desire touch with the work and personnel of the producing enterprises of the country. Comment or criticism by such users of the university product will be most helpful to the instructors of every grade.

m The draftsman and designer 115.

n The local manger, or district representative engineer of the manufacturer 153.

o The shop executive, superintendent, department manager, assistant superintendent in large works 338.

p The producer or manufacturer, owner of the plant, president, vice-president, or executive officer of the corporation, and the mechanical engineer of such producing bodies 966. The subdivision of the last four groups is for the purpose of showing the widespread significance of the contention of this paper as to the economic significance of the mechanical engineer; if all four were grouped into one, they would include 1572 or practically half of the total membership.

q The last group is the office practitioner or independent consulting engineer not officially or visibly related to a producing enterprise, 493. This includes doubtless many who might have been included in one of the other classes previous to Class *l*. It covers the coördinators of design, who are often also contractors, probably many patent men, hydraulic engineers and local managing experts, which if placed under the other headings would still further reduce the size of this class. The broadened scope and opportunity for doing great work which are presented by the large aggregations of capital in the producing enterprises, as compared with the difficulty of great engineering achievement with little capital, are continually attracting men from this group into Class *n*, *o*, and *p*.

r Presenting these facts in tabular summary:

	Group Name	Numbers	Percentage
a	The unclassified	306	10.3
b	The army and navy	11	0.4
	and marine	18	0.6
c	The hydraulic	12	0.4
d	Patents	25	0.8
e	Journalists	30	1.0
f	Mining and Metallurgy	31	1.0
g	Engineering contractor	48	1.6
h	Testing and inspecting	49	1.6
i	Operating engineer	55	1.8
j	Locomotive and railway	57	1.9
k	Electrical engineer	65	2.2
l	Professor and teacher	185	6.3

m	Draftsman and designer	115		4.0	
n	Local manager	153		5.2	
o	Shop executive	338	1572	11.8	53.6
p	The manufacturer	966		32.6	
q	Office practitioner	493		16.5	
	Total	2957		100.0	

There would seem therefore a good ground for defending a twentieth century Tredgold who should define or describe the mechanical engineer of his period: "The Mechanical Engineer is one who by science and by art so adapts and applies the physical properties of matter and so controls the forces which act through them as to serve the use and convenience of man to advance his economic and material welfare. He does this mainly by storing and liberating motor energy through machines and apparatus which he designs and installs and operates for the purpose of fostering and developing the processes of industrial production which use and require such power upon a large scale."

The foregoing discussion draws after it as in its wake a group of other interesting questions; or to change the figure, a number of open doors to other topics appear as we follow the guide along the corridor. Among these for example, is the historical one, as to how the engineer came to be the central figure which he is today. In the earliest times the patriarch with knowledge of safe and desirable pasturage for the flocks was the central figure; later, the war-lord was king; he in turn gave way to monkish priest as supreme center, and after a recrudescence of the warrior and conqueror we are now planning armament and training men and scheming policies to secure peace which shall enable the production engineer to do his best work and with the least waste. As early as the legend of King Solomon is the claim of the tool maker, and the mechanical engineer of today is the heir of the functions of the tool maker on the largest scale. Again, the educational significance of the definition is most important. We have derived our standards in the technical schools from the requirements of the historic Military Academy at West Point. This in turn inherited the policies and practice of the European governmental schools for engineers. We have borrowed also from France and Germany directly. Very close to the heart of such standards lies the devotion to the highest mathematics both as a discipline for the mind and character, as a preliminary training for study in statics and dynamics, and as a means of separating the qualified and the assiduous from the incompetent and lazy. But if fifty per cent or more of the graduates are going to find their life work along lines which make no call for extended use of the higher mathematics; if by using, as the separating sieve a device which lets through many men of a mentality ill adjusted to the demands of practical life in production, and which holds back many men who lack facility in working with symbols of quantity because they can better handle the larger problems of the quantities them-

selves, then it is a fair question whether the splendid discipline of higher mathematics has not been bought at too high a price? Could we not get a better prepared man for his life work if the same discipline and the same selective process for the fit had been secured by more and better physics and more and better chemistry and more economics, even if these were bought at the price of some mathematics?

But my time and the occasion demand that we pass at once to the second phase of the thought of the evening. What can or may the Engineering Society made up of Mechanical Engineers as above, do for the profession? What are its duties and functions? It is plain that these are in two directions; its service to the members within it, its duty to those outside of it. Some duties and service will be the same to those within and without; in others there will be differences.

Taking up first the service to the members within it, the Society can do at least eight things:

First it serves by its existence. The fact that there is such a body at all is a token of its strength. For it means that there are three thousand men and over, who with all their diversities have yet a common dependence upon law and principle, and who are pursuing a common aim. The courage and cheer which comes from association and comradeship is a service. The wave which buffets and all but overturns the struggling skiff beats fruitlessly for harm against the tonnage of the ocean liner. Steadily the great aggregation plows her way through stresses which would be fatal to the same totals if subdivided into units. The whole has a strength which is even greater than the sum of the strength of all its parts.

This benefit may be regarded as one of the most widespread that the Society offers. It is independent of residence location and is reaped by the foreign member as well as by the dweller near the centers. In fact it is more significant to the lonely dweller than to the metropolitan member. It remains even when the other returns to the subscriber to the Society in publications, in association and in meetings either lessen or cease. He may well keep on paying dues (perhaps reduced in amount) after the value of papers and meetings become no longer worth while.

The value of this return is greater in proportion as the Society is larger, so long as its quality is maintained. This is the argument for the national and international body as contrasted with the local body or section. Any policy or step which gives occasion rightly to charge a tendency for a national body to localize is an invasion of opportunity and value. The local body may offer some advantages of its own. It does not offer this one. A localizing of an office organization or of a printing contract or even of a library is not a localizing of the Society as a whole. This happens when it narrows its outlook over the professional horizon or its spheres of influence. But the remotest and least considerable member profits more from the existence of the Society in this respect than the recognized leader or the man of acknowledged eminence.

A second function or service of the Society is the offering of the right

of association. By this is meant more than the opportunity of social intercourse at meetings to be referred to later, but the privilege of association in the larger sense. It is a great thing for a man to feel that his name appears upon a list which has been signalized by the names of John Ericsson and Chas. H. Haswell, and still bears those of John Fritz, Rear-Admiral Melville, Thomas Edison and Chas. T. Porter, John E. Sweet and George Westinghouse. Such association makes for a sense of distinction and of pride which is in itself a safeguard like the ancient obligation "*Noblesse oblige.*" Can any nobler human ideal be set before a body of men associated together than that it should occur to a man when tempted to lower the standard of professional or business ethics to draw himself up proudly and say "My dear sir, I absolutely decline. There are certain things no member of The American Society does." To do dishonorably is to bring shame and confusion upon all his class and disgrace his associates upon the same roll.

Further than this, by reason of this association, the triumph and achievement of one is the glory of all, "This advance in science, in art, in production, in management was made by my colleague and fellow member." This also stimulates the individual to do his own share beyond the confines of his narrower or purely personal interest, inasmuch as he is bound by an *esprit de corps* to confer benefits upon his associates similar to those which he has himself received.

And again the member of the Society is privileged by his association to feel that in cities which are strange to him he has yet the right of fellowship with other members there so far as the right may be wisely exercised. The business approach is easier; the road to acquaintance on casual meeting is shorter where both parties recognize the standing of their common membership. All these emphasize however but the more strongly the necessity for safeguarding the quality of the membership, by the proper committee, by the Council and by the voting members, lest abuse of this so great a privilege makes it necessary that the best members should withdraw it.

The third function of the Society is that of furnishing the advantages of a body corporate in the profession. These advantages appear both among the common-places of the legal aspect, and also from a general view point. The Society becomes a continuing and permanent body whose policy is unaffected by individual deaths or removals. Hence it may safely be made a custodian and trustee of significant gifts. This very building in which this meeting is convened belongs to the Society and not to individuals. It is the Society who has furnished or is to furnish one-third of the ground on which it stands. It is the Society which has furnished the brains and the assiduity whose results appear in the details of its arrangement. If there had been no Society there would have been no building, in whose splendor and distinction each individual is entitled to feel a share. The Society may therefore be made a legatee and beneficiary in wills and testamentary gifts. It can be entrusted with historical material which is so apt to dissipate in the hands of individual inheritors.

But in the larger and general sense the Society supplies a corporate

unity, in that as an organization things come to it which would not be given to individuals. Nowhere is this more evident than in invitations to visit works or places which would not be opened otherwise, which has happened again and again in the past. The Society as an organization supplies the avenue of approach and contact when a body such as a governmental department desires an action which shall be general, and not that of a few persons. This fact of corporate action calls for emphasis of a principle sometimes difficult to carry out except with the good-will of all. It is that when the Society is the recipient of special courtesies and invitations which would not be the privilege of all individuals, it calls for withholding of these privileges from those who are not members, but who are present at any time or place as invited guests accompanying members. It will be plain upon a moment's reflection that such persons should refrain from causing embarrassment by their unintended presence.

A fourth function of the Society is that of providing meetings of its members at proper intervals during the year. An ideal meeting would be one in which at least three elements were combined in wise proportions. The first is a mental stimulus in the form of live topics of professional interest presented as papers or otherwise; the second is the opportunity for social or intellectual attrition with other minds and temperaments during an association or intercourse lasting long enough for acquaintance to ripen; the third is a mental and physical stimulus and relaxation of tension by a sight-seeing which shall not be interesting only for the empty minded or the uninformed. Danger lies in any excess or undue lack of these several elements. If there are too many papers or too much time is given to their discussion the meeting becomes a weariness from excess of the mental stress. It was a very good friend and shrewd observer of experience who cautioned the writer in an early day: "An audience has a distinctly marked elastic limit of patience like a piece of steel. Strain that attention beyond its elastic limit, and it takes a permanent set; it will hate you and despise your best works."

On the other hand, to have too few papers or on topics of little value and interest, is to make a failure for the earnest and busy man who has a work to do at home and is "straitened until it be accomplished." The Society wants his presence and approving attitude of mind for the good he can do by being there; if he feels it not worth his while to come because the meeting is but a frivolity and undeserving of a serious man's attention, both presence and approval are lost. There must be a serious nucleus, else the meeting is a mere excursion. Too great an intellectual appeal, made at the expense of the opportunity for meeting other engineers for conference, for exchange of experience, for story telling, is to invite the member to stay at home and read the printed papers there at his own hearth. If he loses or must lose the vivifying and rousing effect of the spoken word and the electric snap of meeting mind to mind, why not stay away? Particularly as a man grows older and reaches the plateau of middle life, the advantage to him of the renewal of old acquaintance—to which he clings more and

more as his circle narrows—becomes greater and greater. It is a safeguard against a stiffening and stagnation. In this view the practice of the Society in registering and even in labeling all members in attendance at a convention is not a whim or a fad. It arises from a definite desire and purpose to make the approach of unacquainted members both safe and sure and short in time required to effect it. We cannot all remember names; to remember faces is for some a considerable effort. The time of a convention is too short to waste any of it in indirect or preliminary effort to know a man. Introduce yourself by emblem and by name, and enrich your memory of the meeting by what the other fellows thought and said. No home reading of the best papers will result in this.

The third element or factor in a Society meeting is the sight-seeing. This must be a lure or bait, since the first or intellectual phase is partly attainable at home, and few men are brave enough to confess to the existence of the second factor. But the sight-seeing must have a professional or intellectual content or nucleus, or it will not appeal. It must be the opportunity to see or study new development upon its own ground, or it must give a man a chance to examine a variant upon his own line of work, or by reason of its extent and magnitude or the brains or talent expended on its execution it must at least appear to be worth seeing. Otherwise as before the serious minded and the earnest are not attracted by it. These meetings do not occur in vacation time, they are in the midst of the serious business of the year. A meeting some years ago where the Society went to the sea shore and away from all engineering opportunity, while a memorable one professionally, was yet in the retrospect a terror to use by night against the misdeeds of naughty children. On the other hand, the things the member carries away in his memory are not the papers nor discussions. The pleasures lasting in his recollection attach to the things he saw and noted and the people he met. To repeat the shrewd comment of a gifted member who had been chairman of the local committee, and who was being complimented on the successful visit to a steel works of his city: "The meetings of the Society are like a brick wall. The papers over which the Secretary labors so strenuously are the bricks, but these trips and their opportunities are the cement which makes the bricks a unit." Too few bricks, a poor wall; too little cement or badly chosen leads to equal faiure.

This discussion of the function of the meetings gives opportunity to record some personal convictions. In a Society which is national in scope and membership, the selection of the places of meeting should have some regard to the center of gravity of the membership, as it asserts itself territorially. The alternate swing of meetings from the Atlantic slope to the Mississippi Valley has much to commend it; but the extreme is reached or passed when the meeting is so held that both the length of the railway journey and the consequent absence from their posts permit only a wealthy and leisured few to get away to attend it. In other words, the excursion or sight-seeing end here overbalances the other features of such a meeting, and many cannot afford it. In this same category is the proposition to

hold a meeting for papers and discussion as a feature of an excursion or during its progress. The two elements do not mix; the excursion is spoiled for those who must bear the burden of the session; the session is spoiled because the most desired participants are not there. The only excuse will be when the excursion is so long or so tedious as to be a failure as an excursion—when it ought not to have taken place at all.

The speaker has never been a partisan of the formal banquet as a feature of a Society meeting. Unless the Swedish custom prevails of changing seats at the tables, any one meets only those near whom he is seated. Breadth of association or contact is prevented and when fortunate to be among a group of friends, no advances of others are likely; and if among strangers or the uncongenial, few experiences are more dreary. The number of notable dinner speakers among a group of engineers who are earnest devotees of work is small in any case, and most of these are not likely to be present. Dull or futile dinner speech is unendurable. If the dinner is costly enough to be worth while in itself, there is barred out from it a considerable number of men who must regard the expense in planning to attend the convention at all. Shall the ladies present at the meeting be included or not? If included they blank one side of each member so accompanied, and smoking will not be general. Hence, it has always seemed that another form of public social function was much more worth while than the banquet was likely to be; and was very much less trouble to arrange for.

The presence of the ladies at the meetings of the Society has been invited and encouraged from the very beginning, not only as a means of pleasure to themselves and those who bring them, but because they had a distinct function in making the meetings successful. The woman in America as elsewhere is the social expert; the busy or lazy man farms out to her the doing of many social duties, in whose absence the community would lapse in manners and culture. Hence her presence and her activities at a meeting tend to raise the tone much above that which would prevail in a purely "stag" reunion. The man exerts himself in directions of social effort as he would not do in her absence. Her presence also is a restraint, and prevents things from happening which might occur if the man were alone. She secures for the man an access and an ease which without her he would lack. Doubtless also the woman acts to persuade the busy member to bring his participation to the meeting, when lacking her influence the pressure of business would be allowed to keep him at home. His presence and experience cannot contribute to the meeting unless he is there.

The meetings of the Society are one of its principal opportunities whereby the Society as such reaches and impresses the general public in the cities where it meets. The professional sessions do not wield a very great influence in this respect; but the other features of the meeting do. Hence it has been felt to be of the first importance that in all its outward relations the professional and scientific sides of its purpose should be strongly emphasized, rather than its contact with commercial problems. To

this end, the prohibition of advertising or publicity procedure in its headquarters has always been enforced, and so far as possible also in the hotel corridors and foyer. If the commercial instinct for business were once allowed a foothold, the meetings would become the arena of industrial and commercial rivalry, and their high character would disappear. At the meetings also, where the membership comes together on the social plane, the Society is rather comparable to a club, than to a purely impersonal professional body. It offers therefore the club opportunity for discussing business or personal interests and ambitions concerning purchase and sale, which are entirely legitimate if not abused. If the members do not desire immunity from interested partisans of any specialty, the Society can not secure it for them. It may discourage only the making of it inevitable.

The view of the Society as a club during its meetings justifies it in exercising the right to protect itself from an undesirable member who would there bring it into disrepute by habits or behavior in which the majority cannot uphold or defend him. It may not be the primary business of a Membership Committee entrusted with the consideration of a man's professional fitness for membership to reject him if he is so addicted to the use of intoxicants or other drugs as to be likely to bring discredit on the Society at a meeting; the membership however will surely defend such a Committee when it seeks to protect the fair fame of the body as a whole. This must be the explanation of the policy of not admitting to membership candidates who belong to a race with which the Caucasion does not socially assimilate. The man may be all right professionally but his admission would be contrary to good policy. The Society has also the same right to protect itself against any who are known to be prone to unprofessional conduct of any kind. It must do so if the function and privilege of association earlier discussed is to have any meaning.

This division of the subject would not be complete without a treatment of the question of local meetings of sections of the Society. Such sections may be either territorially grouped, or by topics and common interests. As provided for in the By-Laws and Rules of this Society they are to consist of elected members only as regular members of the Section, non-members havings only the guests' privilege of participation in papers and discussions. Members of sections therefore derive their advantage from the existence of the national body and from association with its members independent of the local section, and the advantages of the publications, hereafter to be referred to, from the same fact as well as the general meeting privileges. What they derive in addition is the privilege of meeting other members at shorter intervals, and without entailing expense for a journey or a difficult absence from home. But the very frequency of the meeting and the ease and absence of sacrifice by which it is secured make for a lessened interest in such meetings after the first novelty has worn off and the acquaintances have been formed. The novelty of the more infrequent general meeting is lacking, every one becomes tired of hearing the old "stand by's" at every meeting; the supply of local material for dis-

cussion dries up, and what comes from the office of the national body does not happen to stimulate. Then the section becomes a social body only, and does not help the national body particularly, if it does it no harm. It would be much more useful if what is sought by the section or local chapter were sought in another way, or by means of a body made up of both members and non-members, acting in some affiliated relation with the national body, whose discussion properly therefore falls into the final part of this paper.

In the fifth place, so long as the Members, Council and Membership Committee are sensitive to the duty respecting the quality of the applicants for membership, it will follow that the fact of membership in the Society is a stamp of quality of engineering achievement—a seal or *cachet* of reliability and professional standing. Three or five men proposed this man, and answered most searching questions as to his performance and eligibility. A Membership Committee of five experienced scrutineers canvassed the application and the replies of the backers, and perhaps went outside to establish the candidate's claims or to force the proposers to effective defense of them. Then the Council criticized the report of the Committee and ordered the man's name to ballot; and finally among all who voted on his name there were not found two per cent who knew anything against him which would justify his rejection. All human judgment is fallible, of course; but the successful passage of such an ordeal is a strong favorable presumption as respects any man, to say the least.

Now this stamp of approval upon every enrolled member is a very precious possession. The key to admit to it is held by the voting membership, and those who propose candidates. The Membership Committee unlock as it were an outer door to the vault, but they do no more than this. They do not admit to its privileges. Hence the reciprocal duty of the members is made very plain; if the Society has a function or service along this line, the individual voter is obliged to the greater scrupulousness in the exercise of his duty. If anybody can get into The American Society then membership in it will be little prized. If this separation of the members of the profession into the class within the Society and the class without it be objected to as anti-social, aristocratic and undemocratic, the reply would be that so also is the family. Any man can get into the Society who has shown himself to be qualified to do so. His objection must be against his lack of qualification and not against the Society which upholds a standard.

The sixth function of the Society is its creation and maintenance of a Library. It was not so long ago that every professional man had his private library of some extent, containing the books and periodicals he specially valued and used. But in recent times the enormous increase in the number of books required for any library with a pretense to completeness; the necessity for rapid expansion if it was to keep pace with the progress of the day, the investment required in society memberships to secure their publications, and the bulk of the current periodical literature of the profession have all combined to bring about a change. The housing

and the care of a worthy private library became a problem practically insoluble for the individual, either in office or in home. Hence the opportunity arose for the Society Library, doing for all the members what each could do for himself only with the greatest difficulty or prohibitive expense. To reduce the unnecessary duplication of books and transactions and periodicals required only for occasional reference is a measure of evident economy and advantage.

A reference library which is not also a circulating library can only be made really serviceable to members who live near enough to the library shelves to enable book and reader to be brought together at the home of the book. It is one of the problems of the immediate future to develop the circulating function of duplicate books and publications in a practical way, which shall protect the interests of all parties, enabling the library to render the largest net service. It would seem both narrow and unwise to lock up the library from the reach and use of those not fully qualified for membership, or not able to become such for other reasons. The Society therefore permits and invites a public use of its collections in addition to the proprietary use by the members. If such public use transcends the private use, then to impoverish the shelves by circulation without duplicates seems too heavy a price to pay. It should be noted that the coming together of the libraries of the three societies named as Founders of the Engineering Building has not only more than trebled the scope and extent of the library for all users, but has opened up the circulating possibility by bringing an increased volume of duplicates together.

The library also offers the possibility through its staff, of having researches made for members at a distance, and extracts made and sent, which could not be done in a public library, but which is normal and appropriate in one belonging to the member as of society right. The library can also be made custodian and legatee for books of value and usefulness when their former owner has no longer occasion or convenience to control them himself and give them room and care.

The foregoing services rendered by the Society to its members are all in an imponderable class, and do not have a value which is appraisable in legal tender. The non-member cannot buy them, however wealthy he may be. This makes them therefore of all the functions of the Society the six which are the most to be prized. They are like a franchise, in that the benefits which flow from them are not common to all members of the community but are conferred by special act of the corporate body. There comes next a function and benefit which is extended to members of the Society, but which differs from its predecessors in that it has also a material or appraisable cash value and that it may be secured also by non-members for a price. It is the privilege of the publications of the Society. It must not be inferred from the fact that this return to the members is put seventh upon the list that it is therefore an inconsiderable or secondary feature. It is on the contrary one of the most significant and important, and one around which are grouped many of the activities and much of the organiza-

tion of the Society's business office. It is the item for which directly and intentionally it makes its largest expenditure; it is the element which conditions very largely the esteem in which the Society will be held by members within and observers without. On the other hand, the putting of six other elements of Society worth and function before it, is intended as an attack upon an erroneous opinion held by some who have never had it attacked, that the publications of the Society are the only or the principal return to them for their dues and continued membership. When the volume or value to them of the Society's annual output of papers and discussions fall off in their opinion in any year, this is an adequate reason for discontinuing their membership. The existence and value of the preceding factors first enumerated should be sufficient rejoinder in themselves.

The publications of the Society come to the membership in three forms. The first is the monthly magazine or bulletin which is designated Proceedings, and distributes papers to be read at a future meeting, discussions on papers current or past, memorial monographs, book-lists and Society notices and circular literature. These replace the "Advance Papers" of the former day, and so far as possible incorporate the individual and separate circulars which used to be issued. Some of the matter in this magazine is not to be of permanent record, but of present and current interest. The second form is the bound volume of papers and appended discussions with index and consecutive paging, intended to be the permanent record for future reference. This must issue of course after the regular meetings and at an interval sufficient for the execution of all editorial work required. It need not contain all that the Proceedings did by reason of the limitations of bulk and the inexpediency of permanently preserving everything that every one said in all discussions. But this book, known as Transactions is the monument of the year's professional work. The third form is the pamphlets "Reprints" from the volume of Transactions, being the excerpts therefrom which contain an individual paper and its discussion, printed from the same type as used in the volume. These are of use when single copies of one paper are desired for any purpose, and a stock of them is kept on hand to meet calls from the future.

The publications at present include only material originating in the membership for presentation at meetings, and the result of the activities of the Meetings Committee in persuading contributions from members and others upon topics which they suggest. It has been felt for some time that these were unnecessary and undesirable limitations to place upon the possibilities of usefulness of the publications. They would be of incalculably greater value and use if they could be made to include abstracts of papers before other professional societies than our own; reviews of contributions to technical journalism, book reviews and contributed material by non-members on current achievements, new work, and live topics. An index of professional literature in society proceedings and other journals would be of the greatest value. In fact there does not seem to be any reason outside of the cost of making it so, why the publications of the Society should not

be placed upon such a plane of value and usefulness that no engineer within or without the Society could afford not to regard them as a cherished possession and a valuable asset. Here however, also, as in the case of the value of *cachet* of membership, it is the willingness of the member to give of his time and service to the writing of papers and to the contributing to the material for the publication work of the Society which must be the great factor of success.

The eighth and final function of the Society is that which it contributes through the personnel and organization of the official staff of such a body. The Secretary is the natural and proper head of the Society office with such help in the editorial, the correspondence, the accounting and the clerical detail of the work as the size of the Society and the volume of its daily business make necessary. The conduct of the Society is a business and of no inconsiderable magnitude. The office is also most directly concerned in carrying on the detail directed by the working standing committees and under the Council. The degree and quality of the organization of the Secretary's office for its functions is the measure of its usefulness and service. The American Society of Mechanical Engineers may well feel proud that by the unselfish and self-sacrificing devotion of a special committee in which a past president of the Society, an expert in such matters, was the leading spirit, the organization of its office is as nearly a model of such an undertaking as brains and good will can make it.

Such an office discharges functions to the membership at large and as a whole, and also to individuals. Perhaps the most important duty of the first class is the prepartion of the semi-annual lists of members and its issue. This is not only a professional directory of the highest order, enabling members to know in what specialization every other is engaged; but it is a channel for intercommunication whereby any member may feel sure of reaching directly the other members if he so desires. Its correctness and its completeness are therefore the factors of its value. This explains the trouble taken twice a year to ask the members about their address and their professional engagement. The Secretary's office also reaches every member for service in the matter of the candidates for membership, the voting functions of the members and the details of the meetings as they are to occur.

Besides these public or universal functions rendered to all enrolled members, the Society office may be compared to a ganglionic center through which the mentality of its management becomes converted into activity. Without the organization there would be no organ through which the Board of Directors or Council of the Society could exercise their functions as Trustees. The existence of elective office in the Society is made necessary by existence of administrative functions to be exercised. If there were no business there need be no President nor Vice-President, nor Managers to constitute the Council, nor need of choosing such from among those whom the profession is glad to honor. If a distinction attaches to membership in the Society among the ranks as a private, how much more impressive the

chet given to the chosen officers. It is safe to say that office will never ach any save those who are without a blemish; to be entrusted with it an nor to be coveted, to be worn modestly, to be safeguarded jealously from rm or injury by error or misdeed on the part of its wearer.

The office staff renders also individual service as a medium of exchange knowledge of men and of opportunity. Lines of communication and of quaintance radiate from it as a center to the remotest bounds of the embership. Along these lines may flow question and answer, problem and formation, need and its supply. Much of the Secretary's correspondence of this class, which does not fall into the channels of routine buiness and tomatic office machinery. The office is also the channel through which om without the stores of influence and capacity within the membership ay be reached for the rendering of civic or national service either by the ciety as a whole or its individual members in particular, on commissions committees and in other important ways. In addition to these of course e the unclassifiable services which are personal and individual.

Is the privilege of service and of function all on one side, or has the ciety the right to ask from its members a reciprocal duty to itself? The tter, no doubt. It is the duty of the individual member and his privilege make at least the following effort:

That no fancied advancement of his personal interests by a member should lead to any act or practice which will stain his character and injure his fair fame. If membership and its association carries distinction when its members are distinguished, so the same force carries disgrace to all with the disgrace of the individual. It is for this reason that the Society for its own protection must have a means of ridding itself of a source of defilement through the unprofessional behavior of any.

The individual member should seek to build up the Society in professional and numerical strength. The quality must be kept up for the sake of the elements advanced early in the argument, but influence goes with numbers of the right sort, and opportunity for wider service follows with the increased income on the one hand, and from increased scope of interests on the other. The Society has barely begun to draw from the great reservoirs of professional activity throughout the busy industrial centers of the United States; the world is ours also.

The individual member should build up the activities of the Society as respects its papers and discussions. This calls both for personal effort in contributing himself from his own experience and work, and for the interesting of his neighbor also to do the same thing. If the dream of making our published Proceedings and Transactions a professional necessity to every engineer is ever to be fully realized, it must be when from all over the flow of knowledge, data, skill and experience into the Society's channels is deep, full and never failing. What it will mean to the Society if these ideals are made realities, it is beyond the clearest and most hopeful vision to pierce and prophesy.

Consideration must now pass to the final topic under review, which is

the possible function of the Society to the profession who are not enrolled in its membership. If the foregoing argument has been conclusive, it is plain that such service or functions should be discharged without a prejudice to the interests of the membership itself. There are two extremes of view and opinion. The one is the aristocratic idea, that the Society exists exclusively for the advantage of the members. This in a modified form may be called the English idea, and is natural where passage from class to class is not easy by reason of their quite definite stratification. This plan would have the privilege of membership narrowly restricted, open only to proved and distinguished ability, and therefore to somewhat advanced years in the majority of cases. The other extreme is the communistic view professionally, that all adherents or practitioners of engineering are equally eligible, regardless of professional achievement or training. All draw equally from the common fund of professional advantage from membership; but of course there are no private fortunes of distinguished advantage, and no one draws as much in the larger community from an equal fund as he does in the former case. This again in a modified form from the extreme may be called the German idea. The American does not fancy either extreme; but between them is room for a large diversity in the middle space. It was proposed in this Society (1889-1890) to create such an aristocracy. It has been urged (1902-1904) to so multiply the feature of sections of the Society as to approach to the more communistic or continental idea. The safe course is between these extremes. In the British aristocratic atmosphere, membership in the Institution carries with it a distinction which is recognizable; the advantages of membership in the German Verein of Engineers are on quite a different plane. Is a policy or plan possible which shall secure the advantages of both? The writer believes it is.

A membership which is ill-assorted and non-homogeneous will not be a strong one regarded as a unit. The differences in education, in extent and quality of experience in culture and social equality as the former factors affect this, would seriously interfere with the success and unity of the meetings. Unwieldy size of meetings restricts the number of cities available for such meetings, and shuts out many places altogether for lack of hotel and housing accommodations. To extend therefore the privileges of the first five functions of association due to its existence, to the inferring of distinction, of meetings and of corporate unity either cannot be brought about at all to those not eligible under the present wise standards, or else would become theirs at a price so great by reason of the debasement of the coinage in which their value is reckoned, that it ought to be paid. No such restriction holds however with respect to local meetings which may include members, to the library, to the publications and to the office organization of the Society.

The extending of the library function has already been referred to, when it was made a free public reference library. It is now open to free consultation by non-members as well as by members, the only present difference being that members are permitted access to shelves and alcoves

directly, while others must work through the librarian and his staff in a general reading room. As the library grows in usefulness and in the members who use it, it will doubtless happen that the system of management will have to become identical for both groups, and the non-members' privileges be the same as those of the member. The same conditions—mainly financial—which will permit the addition of the circulating feature of the books among members, will also permit a similar although perhaps a more restricted circulation among the engineering public who are not members. This usefulness therefore would seem to be provided for.

The usefulness of the office organization under its present completeness and elasticity would seem to be limitable only by the demand, made upon it, the room for its accommodation, and the cost of its compensation. If extensions of its functions are accompanied with a proportionate return in income, the possibilities of this function would seem to be provided for as widely as use can be found for it.

The publications of the Society are available to non-members by subscription and by purchase. The cost of composition, illustration and editorial revision is incurred for the first copy of any paper, and all contracts and systematization are provided for the first paper secured and issued. After that it is merely the paper, press-work and distribution expenses which have to be met, which are the least in amount and vary directly or in a diminishing ratio with the number of copies made. Hence all that is necessary here is to create the demand by making the Proceedings and Transactions so valuable and so comprehensive that no member of the profession, member or non-member, can afford to be without them on his desk or in his reference library; and the result is won. This also would seem a result and a function for which all preliminary steps had already been taken. What remains is to do it.

This leads up to the final functions of the Society, with the urging of which this paper will have accomplished its ultimate purpose. It is that the Society should foster and cause the growth of other organizations or societies or clubs, specialized either by their location in city or district or state, or by their particular line of study and pursuits. Such bodies should be entirely autonomous as respects their officers and procedure and rules and financial support. Their membership should include both members of this Society and other engineers, the latter embracing both those who are eligible to membership in this Society, but having a prior allegiance to some other Society or do not as yet want to join any such organization, and those who by training or experience are not yet eligible to any existing national society. Such bodies should be known as: "The ——— Society of Engineers," or some equivalent name, the blank being filled by the name of the place where they prefer to meet, and the full designation to be "The ——— Society of Engineers Affiliated with The American Society of Mechanical Engineers." The emphasis is to lie upon the fact and relation implied under the word "Affiliated." The members of the local or specialized body would not be members of The American Society and would

not or should not call themselves so. They are members of their own society. Their autonomy and self-support secures for them the dignity and responsibility attaching to their own control. Their errors of judgment or policy would not complicate the national body nor introduce political problems into the latter of a sectional or factional sort. They are and would continue to be local societies, or national ones with a specialized outlook. Now what will be the basis of the word "Affiliated"?

The American Society of Mechanical Engineers shall covenant to supply every member of such affiliated body each month with a copy of its monthly magazine containing its Proceedings, and such additional copies as can be advantageously used either free, or much below cost, according to the size of the local body. The papers and discussions in these Proceedings shall be the topics of discussion at such meetings of the local and special body as may be held, but by no means to the exclusion of papers on topics originating in the local membership which will be welcomed in addition. The American Society of Mechanical Engineers shall furnish or pay for a stenographer to report and typewrite the papers and discussions of the local meeting, and shall pay in whole or in part for the rental of the hall in which such professional papers and discussions shall be presented. In return for this, the local shall send a full typewritten report of its professional sessions to the Secretary of The American Society, which latter shall submit these to the Meetings and Publication Committees of the national body, with a view to the exercise of their right to publish in the Proceedings and Transactions such contributions as are judged of value. If the local desires to publish for itself material not available for the use of the larger body, it could do so through the advantageous large printing contracts and the editorial staff of the large body at much less expense to itself than if it tried to do the same thing by itself.

Among the arguments for this plan are:

For The American Society of Mechanical Engineers;

a A greatly increased scope of usefulness and influence, extending far beyond the limits of its enrolled membership, and limited only by the horizon of interest in the undertaking.

b The creation and multiplication of sources and centers from which material will be procurable to enrich its publications.

c Thereby a greatly increased value and demand for these publications: from the increased demand an increased income, and attendant increase in the value of the publications in a continuing ratio.

d An increased appreciation of the Society and its work, leading to an extended desire on the part of those eligible to join the national body, enhancing for the latter the significance of the first series of its functions referred to in this paper which increase with the character and number of the members.

e The American Society attains these objects without lowering the professional standard of membership, without admitting even to *quasi* or implied membership persons who are not eligible through the regular

channels. It avoids any financial or other obligation for the local, as would be the case if the latter were called a chapter or section of the larger body. It pays only for what is of value to it, which is the supply of professional literature; and where the local held no meetings nor sent any papers there would be no expense. The price which The American Society would pay is the increased cost of its operating account and publications, but this would seem likely to be more than returned to it, if not in cash directly, yet in other values. Probably also in cash.

For the local or specialized body would be secured:

The prestige of affiliation with the larger body; doubtless therewith certain privileges of courtesy for the members of the local when a convention was in their vicinity, and certainly the courtesies of the building in New York City for such affiliates.

A wide, certain, and cheap supply of invaluable professional literature, topics for their meetings when their own supply failed.

The reduction of unavoidable expenses attaching to a local meeting for papers and discussion to a mimimum even to nothing if so desired. This value for the minimum would probably not be desired by most locals, but the dues prevailing in that local would be small and would be mainly devotable to their own interests.

The maintenance of the standard in the local to a plane of creditable achievement. The continuance of the local could be conditioned upon an earnestness of devotion to it which should be worth while.

The local would be entirely self-governing, with its own officers and control in every respect. Its own officers would command the dignity which alone makes the burden of office worth while, and the local is responsible itself alone for its success or failure by reason of the effort put forth by those interested.

The local by operating its business detail through the office of the national society obtains the pecuniary advantage of the larger scale of business in The American Society and the service and coöperation of its trained experts. Their accounting and purchases, as well as their printing, could be done for them at much better advantage in the large office. If accounting and addressing of envelopes and circulars were done at The American Society office, the office expense of the local would disappear, and the cost of the former could be taken care of in its appropriation to the latter.

Of course the financial responsibility of The American Society would ve to be safeguarded by limiting the appropriations for the locals both period and in amount, and making them conditioned upon a return from a local satisfactory both in quantity and quality.

The word "local" has been used in the foregoing as descriptive of the lliated body, inasmuch as usually such a Society will be made up of those siding in or near a city or town. There is nothing in the plan however preclude an organization already existing and made up of specialists in

any line, from asking affiliation with The American Society under its provisions. The body may now be national, and having for its special topic of discussion the engineering of the motor vehicle, or that of the production of artificial cold, or certain sanitary problems with a mechanical outlook. They would benefit by such affiliation and they would at the same time strengthen The American Society of Mechanical Engineers, and sacrifice nothing themselves.

The writer therefore as he lays down his official insignia of service after these many years, leaves the foregoing suggestions for the elaboration of his successors. All the organic change which would be necessary would be the creation of a Standing Committee on Affiliated Societies with the required By-Laws for its guidance, on the same footing as the Research Meetings, Publication and Library Committee, now in existence. The rest the Council may provide for by resolutions and standards in the Secretary's office.

If these ideals and possibilities shall prove to be practicable and realized, the opening of the new Engineering Building and the twentieth century will mark the beginning of an era of progress of prosperity, of splendid usefulness and brilliant achievement which will give to the Society position and recognition which has never been dreamed of before.

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